

In This Issue—A. E. A. and Service Managers' Meeting Reports

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# MOTOR AGE

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Number 21

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CHICAGO, NOVEMBER 24, 1921

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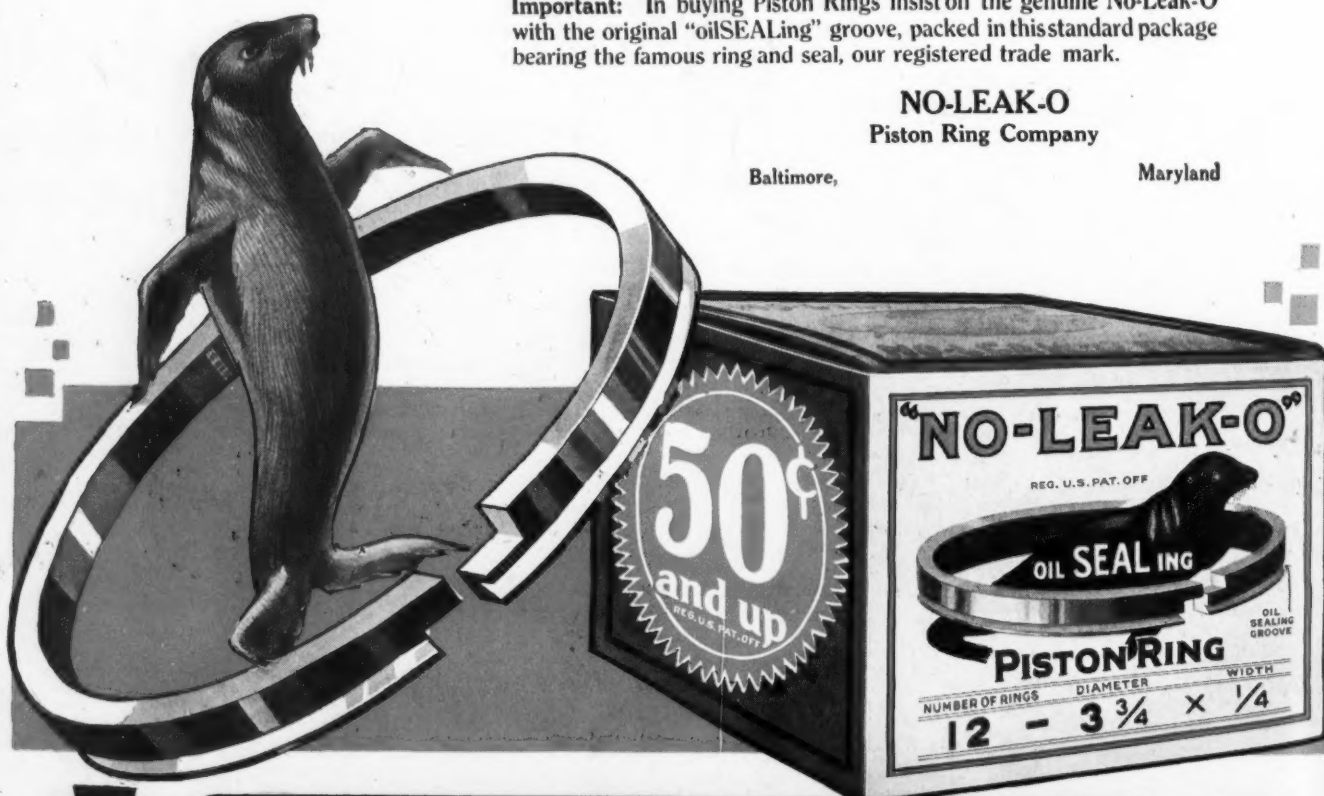
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Baltimore,

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**NO-LEAK-O** *Piston Rings*  
WITH THE ORIGINAL OILSEALING GROOVE





# MOTOR AGE

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# Making Winter the Busy Season

## Garage and Repair Shop Men Profit by Piston Replacements

A LOT of profitable business is waiting for the garage or repair shop man who goes after piston replacement work the right way.

When you have a job of regrinding cylinders, you put in new pistons, of course. But what kind do you put in? The ordinary stock factory cast pistons, or pistons that will actually improve the motor?

### Pistons For Any Car.

Maybe sometimes you have had the idea that there weren't any other kind that would fit an old model car, for instance.

Do you know that DELUXE pistons are made for over 1,200 different kinds of internal combustion motors? And these light weight, reinforced cast iron DELUXE pistons make old motors like new.

They eliminate the usual vibration and make enormous savings in gas, oil and upkeep costs.

### Where You Make Profits.

But don't be satisfied with piston replacements that *must* be made.



*Look inside—you can't go wrong.  
Very light and very strong.*

There's a far more profitable field in replacing the now obsolete heavy pistons in *every* car. Even aluminum pistons can't stand up against a set of DELUXE pistons, because DELUXE pistons can be fitted close, eliminating oil pumping, gas leakage and piston slap.

It's not much of a trick to convince a motorist that he is losing money every day he keeps the old heavy pis-

tons in his motor. And there's no use putting in new pistons, unless they are DELUXE.

Ten minutes selling talk ought to yield you a profit of a dollar a minute or more; every day this winter.

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You don't have to wait and hold up a man's car to put in DELUXE pistons, either. The DELUXE distributor in your territory can get pistons to you in 24 hours or less. Isn't this better than having to wait two weeks or more for pistons that can't possibly work as well?

Right now, while you think of it, look up the DELUXE distributor in your territory. You'll find his name in Chilton's Automobile Trade Directory, The (Red) Automobile Trade Directory or Might's Canadian Automotive Directory.

### At the Shows.

When you go to the Automobile Show, be sure to look in at our booth where a hearty welcome is waiting for you.

At the New York Show, we have Section D-25.

At the Chicago Show, we have Basement Section 36.

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The Successful Light Weight Piston ©

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# MOTOR AGE



## The Importance of the Customer

**T**HERE are few men in the automotive industry who will question the right of Norval A. Hawkins to have an opinion as to the present and future of the industry. It was his vision that gave to the industry the great Ford service and sales system.

Now Hawkins is a member of the advisory staff of the General Motors Corp. He is repeating the work he did for Ford.

**H**AWKINS was invited to be one of two speakers at the Factory Service Managers' Convention in New York last week. His speech is said by all who heard it to be the most advanced word that has been spoken on service. We cannot refrain from calling attention to his text, which was, in part, as follows:

*"As one of the trade papers recently expressed it—'We, as an industry, as sitting about a table at the head of which sits Mr. Car Owner in the role of host. At each side we have our esteemed friends, the manufacturer, the distributor, the dealer, the service man, the accessory man and others. We're all eating out of the same bowl and this bowl happens to be in charge of the man at the head—Mr. Customer.'"*

**I**T is with great pleasure that MOTOR AGE reproduces the original of the cartoon which formed the text for this history-making address. It was first printed in MOTOR AGE, June 23, 1921. Mr. Hawkins' speech is printed in this issue, starting on page 10.



# Keeping Present Owner Satisfied More Important Than New Car Sales

***F***ACTORY Service Managers in New York Convention Become Firmly Impressed with the Necessity of Exerting Every Effort at the Factory to Help the Dealer Render Better Service—Agree Flat Rate Plan Will Eliminate Bill Adjusting

By B. M. IKERT

**T**HE major thought coming out of the two-day convention of the factory service managers' convention, held under the auspices of the National Automobile Chamber of Commerce in New York City, Tuesday and Wednesday last was, that after all has been said and done, the customer, Mr. Car Owner, is the dominating factor in the field of service and maintenance. It is he who makes it possible for factories to meet their payroll of something like one billion and forty million dollars a year. If he stops buying, everything stops. Manufacture, distribution, selling, servicing and every other phase of the business then ceases to operate.

While the most thought seemed to center about the relationship of the car owner to the business in general, probably the most startling statement of the entire session was made by Norval A. Hawkins of the advisory staff of the General Motors Corp., when in his address entitled "For Whom Do You Work?" he said:

"It is my prediction that within three years every reputable repairshop in America will be operating on some form of the flat rate system. Whether or not we like it now, we've got to come to it and when we do come to it we will be surprised at just how low our efficiency has been in the past."

This statement, coupled with the fact that General Motors Corp. is taking steps to put in the flat rate system in all its service stations, would seem to indicate that the flat rate or fixed price system of selling service has made great progress in the last year.

Hawkins dwelt at length on the flat rate system, but the real discussion came the next day, after the address by P. E. Chamberlain, long an exponent of the fixed cost system, who now is delivering to automobile dealers and others in the industry a series of lectures on the better selling of service.

## **SERVICE MANAGER SHOULD HAVE SOMETHING TO SAY ABOUT DESIGN**

Some of the service managers present were strongly in favor of the fixed cost system, while others, on the other hand, maintained that the maximum estimate plan, as used in many shops and service stations now, still was the answer.

In spite of all that has been written and spoken about the flat rate system there still seems to be considerable confusion on the part of many in the industry as to just what the flat rate plan is. There still are those who maintain that it is "all right for the other fellow, but it won't fit our conditions." Chamberlain, in answer to several attacks on the flat rate system, stated that at the bottom of any transaction between customer and merchant, automobile merchant or otherwise, there always was the attitude on the part of the customer in the following question: "How much will it cost and when can I get it?" The flat rate tells a customer all he wants to know.

Along this line Hawkins said:

"In our factories we know just how long it takes to do a specific operation, and the exact cost of the material and labor involved, whereas on the other hand, our service stations refuse point blank to tell a customer what a repair job is going to cost him and, as a matter of fact, they seldom charge any two people the same amount for doing the job.

"To me the necessity of standardizing repair operations is so obvious and so simple of accomplishment that it makes me mad when I hear a service manager say that it is impractical in connection with his particular product.

"I'd like someone here to tell me the difference between putting on a steering knuckle in a factory and in a service station, so far as cost analysis is concerned."

The two-day program was planned with two addresses only, those by Hawkins and Chamberlain. The rest of the time was given up to discussion on various topics in connection with various phases of the service business. The morning session of the first day was devoted to discussion on the parts situation. The afternoon session was scheduled to be a "Service policy session," but in reality was a continuation of the unfinished discussion on the parts situation. The second day took in the selling phases of service and Chamberlain started the ball rolling by his talk on "Selling Service Intelligently."

## **CHAMBERLAIN DEFENDS FLAT RATE PLAN OF SELLING SERVICE**

In this connection it is unfortunate that addresses by both Hawkins and Chamberlain, as well as the discussion by various of the service managers present, could not have been heard by every president, general manager, engineering department, production heads, etc., of every automobile factory. As one service manager expressed to another while listening to a discussion on the parts situation: "It's all right, but try to sell my factory that."

If conditions exist in the factories as indicated by the sentiments of the men assembled during the convention, then the automobile manufacturers have to wake up to some facts, which, therefore, have been totally ignored. The service managers, as a class, know pretty well what is needed in the maintenance work on automobiles, but the trouble seems to be that they are not allowed enough voice, if any, in the design of a car, or truck, to be of material benefit.

Some factories content themselves with having the service manager hardly more than a distributor of parts. If he can see to it that a large number of parts—which, by the way, often are parts which the factory has rejected in the assembly of a car, but which are all right for "service," are distributed throughout the country—he is all right. He is not allowed nor is he deemed capable of looking over the blueprints of a new design with the thought that he might nip in the bud some glaring error, which, while it might facilitate production, will react to the detriment of the dealer's service department, especially the service department of the small town dealer,



whose facilities for rendering service may be somewhat limited.

Outside of the fact that the service manager's job is a pretty hard one in the average factory, there was no one particular thought on which the assembled men agreed as a unit. The only unanimity of opinion was manifested when the chairman announced that the meeting would adjourn for lunch, when they arose as a man.

This meeting probably was the liveliest one which the N. A. C. C. has put on. Even though there was not any one point on which the assembled body came to an agreement, there was much said and done of a constructive nature to insure every man being well repaid for the trip. Just how much of this will be carried back to the factories and made use of is debatable.

Some of the service managers will probably get a good message over to the directing heads of the factory, while others were congratulated on having been able to get the men together for a common airing of their problems. It is a big thing when men from the representative car makers get up and admit to those present that they have "done some rotten things at the factory" and then go into detail on some of them.

The service managers are pretty well aware of the "bugs" in a car and it is a pity that every service manager could not have brought along with him some official from his factory to listen to the tales of woe.

Those whose privilege it is to sit in at a convention of this character cannot help but realize that the so-called service manager's job is not in keeping with his title in the same way as we look upon the production manager or the engineer. The production manager controls production and the engineer the design, but just how does the service manager control the serviceability of that car? Very little. Often, not at all. He must take what is handed to him and then find ways and means to keep the product running after it gets into the hands of the owners.

It is not such a hard job for an engineer to lay out a design and get the factory to produce this design in quantities, but it is a hard job to insure the product's standing the wear and tear to which the average owner subjects a car. If the factory has made a mistake, who gets the blame and who has to take steps to correct it, so far as possible? None other than the dealer's service men. And, the factory service manager is called upon to help these dealer service men all he can, yet he has nothing to say regarding the building of the product in the first place. He has to struggle with defects brought about by causes beyond his control.

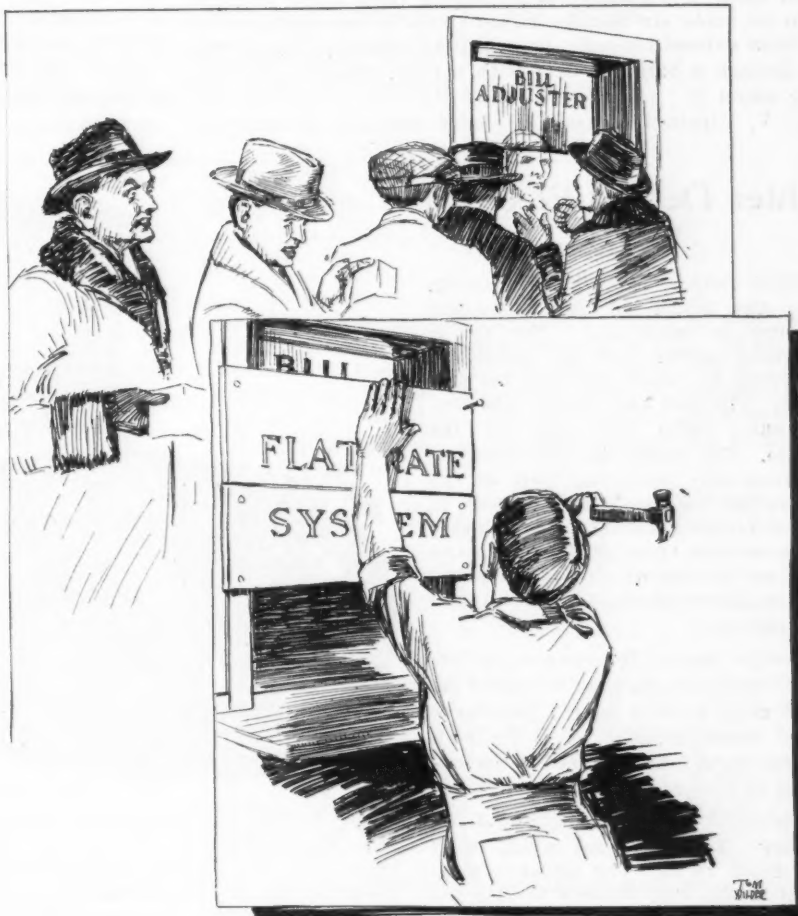
When the car owner registers a kick about a bill which to him seems excessive, the dealer or his service man has to explain to the customer that it took so many hours to get at the job. The customer does not understand; all he knows is that the part costs about 25 cents, but why the \$3 for installation? The customer does not know and cannot see why the shop had to tear half of the engine down to do the work and the service man cannot give any good reason other than he could not get at the part otherwise and that at so much an hour the job naturally costs so much. Then the service man or dealer might take the thing up with the factory, which politely states that the particular method of construction was used "to facilitate production and use up present inventories."

The factory service manager's job is a hard one because the factory often does things which he is expected to "cover up" in some form or other, in order that the dealer organization will stay on friendly terms. Just why factories should

persist in turning over "for service" rejected parts will always be a puzzle, especially when it is realized that after all the service which the car owner gets is what keeps the factory wheels turning. There can be no excuse why parts which have been turned down for factory production should be sent out by the service department to the dealer's parts stock. Here's what happens.

Take the case of crankshafts sent out by one factory. In the assembly of the engine, the crankshafts are tested for accuracy in various ways and those which come within the limit of error are used in making up the engines at the factory. The others are tossed aside and marked "service." How in the

## Send Your Bill Adjuster on a Long Vacation



world a factory expects a dealer's service department to give a customer a decent job on a new crankshaft installation by using rejected shafts is hard to conceive. The dealer or the service department does not know the shafts are imperfect. Then when later the car owner comes in and cusses the service station for doing a bum job, the dealer has no comeback. His mechanics may be the best and the job may have been turned out as accurately as could be done, but the shop may never suspect that the shaft is sprung or defective.

For all these things the dealer's service station gets the blame first and then these fellows take it up with the factory service manager. We believe the real solution of this evil lies in the following of the plan of which Mr. Hawkins spoke. He said that in a certain factory the production of parts for service must be set on any particular day before any production of parts for assembly in the factory is touched. And these parts are carefully checked, properly crated and identified, so when they reach the dealer's service station, they will be in just as good shape as the parts going into the new car. This factory realizes the essentiality of getting to the ultimate buyer the best quality of its product, because as has been said many



times, the way to pave the road to repeat orders—that which insures factories operating and dealer organizations remaining in business—is the satisfied customer.

To draw a conclusion from the various things said and done at the meeting, it might be said that the factory service manager of the future will be one of the most important men in the organization. He must necessarily be such.

He should preferably possess enough engineering knowledge to be able to understand intelligently the fundamentals of design. He should understand enough about production methods to know limitations in this respect. He naturally should be a mechanic. He must know conditions as they exist in the shop of the average service station and he must be in a position to design and construct service equipment to go with a new car the minute that car is released to dealers.

He must be in a position to halt certain changes in design that mean a dealer or his service station must tool up especially to meet that change, only to find that other changes have to be made six months hence. This is one of the evils which have existed for some time in the industry. The factory sends through a batch of cars with certain changes and says nothing about it.

As E. V. Rippingille, assistant sales manager of Hudson,

said: "Let the factory make a good automobile and stick to the design for some time, not change it, or bring out new models every so often."

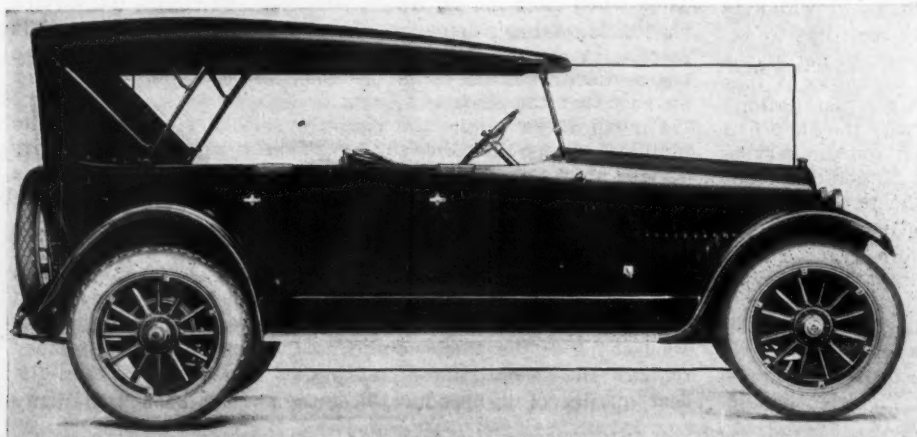
On the discussion of the parts situation, particularly as to reducing the price of parts, no definite conclusion was reached, only that many of the men present stated that they could not reduce the price because the unit makers had made no reduction on their end of the line. Some men were strongly in favor of the factory putting on parts to identify them as genuine parts. To this others took exception, stating that inasmuch as the car owner was the man to satisfy, it made little difference where he got the parts so long as he got service. Thus, if a certain make of bearing was used in a car and the owner of the car or the dealer saw fit to buy a bearing from a local representative, the customer was just as well pleased because he got what he was after—service from his car.

The flat rate system of selling service brought much lengthy discussion and Chamberlain is to be congratulated on the excellent manner in which he presented to the assembly the various phases of the plan. This subject is so involved that it will be taken up in much more detail in a forthcoming issue of *MOTOR AGE*.

## Lighter Detroit Electric Car

A NEW Detroit Electric car, known as the Model 90, four-passenger coupe, is announced. This car is considerably lighter than the brougham model which has been standard for this company. The new car weighs 3385 lbs., as compared with 3900 lbs. for the brougham. The weight has not been removed from any particular part of the structure, but the car is lighter both in body and frame resulting in a slightly higher maximum speed of 25 m.p.h., and a range per charge which has shown itself to be better than 75 miles in and around Detroit.

The coupe has a four-passenger capacity. Three persons may be seated on the rear seat, while a fourth passenger could be accommodated on a Pullman seat in the right front corner. A removable seat is placed in the left front corner to be used by a fifth person in an emergency. The rear seat width is 49 in. and depth 18 in. The distance from the front to the rear window is 63½ in., and from the top of the cushions to the roof 38 in. The door opening is 24 in. The car is upholstered in whipcord with Turkish type of upholstery. The panels are painted either in Cobalt, dark blue with light blue stripes or Brewster green with light green stripes.



The battery equipment is a Philadelphia Diamond grid, 42 cell, 13 plate. There are five speeds ranging as follows: 6, 10, 15, 20 and 25 m.p.h. The tires are Firestone pneumatic cord size 32 by 4 in. The equipment consists of two headlamps, two body parking lamps, one rear signal lamp, interior dome light, electric Klaxette horn, Hanlon rain vision shield, Warner speedometer, volt and ammeter, charging plug and tools.

## New Six-Cylinder Nash

ANNOUNCEMENT is made by the Nash Motors Co. of a new series of six-cylinder cars, incorporating amongst other things, the following features:

New and doubly powerful emergency brake on transmission.

Accurate gasoline gage on dash

Low front seat with broad cushions

Parking, lights on cowl

New curtains

Low tilted windshield

Pocket in left front door for tools

Two of the outstanding features of the new Nash 691 are its electrical equipment and new spring suspension. Delco starting, lighting and ignition now are used. The spring suspension has been redesigned for better riding qualities.

New straight-line bodies and lower top distinguish the five and seven-passenger touring models; the sedan body is lower and similar refinements in appearance have been added to the sport model, coupe and roadster. All cars are equipped with parking lights and silvered outside door handles.



# For Whom Do You Work?

A remarkable service address by Norval A. Hawkins

**I**N THIS ADDRESS the new situation in the automobile field is graphically summed up. The speaker introduces Mr. Car Owner as the new boss of this great industry. This has always been the theory of Motor Age. No dealer can possibly afford to miss reading every word of this speech.

By NORVAL A. HAWKINS\*  
of the Advisory Staff of General Motors Corp.

**T**ODAY the automotive manufacturing industry in the United States represents an investment of over two billions of dollars. There are about 700,000 individuals directly engaged in the manufacture of motor vehicles, parts and accessories and, in addition, there are more than half this number directly identified with the retail sales and service end of the business, giving a total of approximately one million people who are making a living for themselves and their families directly from this, the second largest industry in the world.

The organization ramifications of the industry are almost limitless. We use every kind of skill from the blacksmith's to the artist's, and every kind of executive from the gang boss to the highest type and most experienced managerial talent—with a legion of shadings in between—sales managers, advertising managers, chief engineers, draftsmen, tracers, inspectors, traveling representatives, distributors, dealers, sub-dealers, service managers, assistants, foremen, sub-foremen—on down the line to the most lowly mechanic's helper and floor sweeper.

In the labyrinth of the average manufacturer's organization chart, it is difficult for most of us employes to trace our exact status, and with the complex growth of the modern corporation we are inclined to forget who our boss really is.

I think we would all do well right at this time to hark back to basic fundamentals, forgetting the frills, red tape and intricacies of our twentieth century organizations, and ask ourselves the question, "For whom do we really work?"

It is not the sales manager nor the general manager nor the board of directors, nor even the stockholders. The man to whom we really owe our jobs, individually and collectively, figure it any way you like, is none other than Mr. Retail Customer—Mr. Car Owner—the ultimate consumer. It is none other than he who pays us our salaries and tells us whether we shall run full time, double time, half time, or not at all.

It is he who is meeting our annual payroll to the tune of one billion and forty-two million dollars a year, and it is upon him that we must depend for the future security of our entire industry.

The mammoth automobile industry of today exists because of the good will of this ultimate consumer.

As one of the trade papers recently expressed it—"We,

as an industry, are sitting about a table at the head of which sits Mr. Car Owner in the role of host. At each side we have our esteemed friends, the manufacturer, the distributor, the dealer, the service man, the accessory man and others. We're all eating out of the same bowl, and this bowl happens to be in charge of the man at the head—Mr. Customer!"

(The cartoon to which Mr. Hawkins refers in this paragraph is reproduced on the first page of this issue of Motor Age.)

This Mr. Customer, in the composite, represents over 9,000,000 car owners and an even greater number of prospective car owners. As a rule, he is a pretty fair sort of a person, and the chances are that he will give all of us a generous helping, and if we are considerate of him, if we observe his rules of etiquette, if we cultivate his acquaintance—if we show a proper respect for his likes and dislikes—his whims and his fancies—perhaps he may give some of us an extra spoonful or two—for, mind you, the bowl is still well filled.

It is needless to remind you men that we are in a full-fledged, "18-karat" buyers' market—the days of easy sales and of "letting the buyer beware" are gone forever, and it is just as well.

## Buying the Customer's Dollars

The automobile business must be reduced to sound fundamentals. We are entering into a new era. We've got to forget some of our past tactics. As our Mr. Charles F. Kettering recently expressed it—"the whole scheme of things has been reversed. We are out trying to buy the customer's dollars—our currency is in the form of gears, cylinders, pistons and axles—the exchange must be mutually advantageous—both sides must benefit—honesty must be the basis of all transactions. If the customer tries to pass off a counterfeit dollar on us, we refuse to take it—and by the same token, if we attempt to give him a counterfeit gear, or a defective axle, he has an equal right to become incensed."

In the new scheme of things we must put up a stiff fight for every bit of the business that we get, and service to this Mr. Consumer is the cornerstone upon which the future progress of our entire industry will rest.

When such a mechanical product as an automobile is sold, service is a necessary corollary to sales and advertising. One of the fundamental principles of management, therefore, is that service, sales and advertising are essentially interrelated and must be governed by the same general policy if perfect coordination is to be effected.

Service is not a matter of minor concern, to be considered after the purchase of a car, as a mere incident. It is of major importance. Properly coordinated with selling and advertis-

\* A Service Talk Delivered Before Service Managers' Meeting, National Automobile Chamber of Commerce, New York City, November 15, 1921



ing, the service policies of any company, when a system of service is made effective, will be the most powerful means of building up its business.

Nothing in business is more essential than making friends. Model service will make more friends for the motor vehicle industry than can be gained in any other one way. Service cannot be good unless it is intelligently planned, systematized and everlastingly followed up. The service function must be performed dependably and uniformly, everywhere that there is a need for service. And it must be performed economically, so that the customer who is served will feel that he has been fairly treated.

"Service" is a matter of major importance, deserving of the greatest executive consideration. All of us should be directly concerned with the establishment and use of basic principles of perfect service to every car user, irrespective of the make of car that he drives.

#### Cooperation Needed

We must be unselfish about this thing. We can best help ourselves by helping one another. No one manufacturer can ever hope to have enough service stations to care for each and every one of his vehicles irrespective of where they may happen to be. The owner, at some time or another, is at the mercy of an independent garage or a dealer who has a competitive interest. It is only through a proper cooperation that we may adequately serve the owner.

Experience has developed all the right principles of service. It remains only for us to put these principles into effect by applying them to our own specific products and cooperating one with another.

#### The Causes of Service

There are five causes and *only* five causes of service cost to the producer, or the car owner, or both. They are as follows:

- 1st—Faulty engineering design.
- 2nd—Faulty production, including careless workmanship and faulty material, or both.
- 3rd—Incompetence on the part of the service repairmen
- 4th—Incompetence on the part of the user.
- 5th—The wear and tear of normal use.

The first, second and third causes for service expense are directly within the control of the manufacturer, and we as service managers should make it our business to take some interest in the fifth cause.

Service should properly begin with the design of the car—in fact, it should begin with the very conception of a product and it should be projected through the engineering, manufacturing and marketing process, assuming an ever-increasing importance after the product is in the hands of the user and until the time that it is ready for the discard through legitimate and honest wear—after having given an adequate return on the customer's investment.

If the maximum value to the user with the minimum service cost to the manufacturer is to be attained, then the future changes in our products must be done in the direction of eliminating needless varieties in design and toward the selection of the best types of construction.

The elimination of needless variety is necessary to reduction of both production costs and service costs for two reasons, to wit:

- 1st—Quality of workmanship and material are more easily maintained as the variations in mechanical practice are decreased; and
- 2nd—Because incompetence of the service workman can be more effectively reduced as the variations in mechanical practice decrease.

It necessarily follows that future changes in automotive products should not only lead toward the elimination of needless variety, but the maintenance of the needed variety and the correct use of these variances with respect to more intelligent marketing policies.

I wonder just how much thought your engineering depart-

ments are giving to those questions of service. I'll tell you some of the things we are beginning to do in the General Motors Corporation.

First of all, in the future, no new model will ever get into production until it has been subjected to the most grueling scientific tests that we are able to devise. I don't refer to block tests and cross-country advertising tours, either. I mean that a proposed model must be subjected to service, equivalent to what it would get from the most careless user during the normal life of the car, keeping an accurate "log" of wear, breakage, etc., in order that we may in our service manuals give the dealer and owner specific, accurate and dependable information regarding the upkeep, repairs and replacements. Also, that we may give the dealer, right from the start, accurate data regarding the replacement parts that he should carry in stock.

And this is not all. Before we go into production on any new model, such a model must be carefully analyzed from a mechanical service standpoint. The design will not stop with the completion of the layouts and detail drawings covering the parts of the car itself, nor even with the design of production tools for its manufacture. Before any such job goes into production in any of our factories in the future, no less than five sets of tools must be designed, as follows:

- 1st—Jigs and fixtures for factory production.
- 2nd—Repair tools and fixtures for service shops at branches and large distributors.
- 3rd—Repair tools and fixtures for large dealers.
- 4th—Repair tools and fixtures for small dealers and sub-dealers.
- 5th—Hand tools for the owner designed especially for the particular car and adequate for such minor repairs and adjusted as may be entrusted to them.

In other words, when the owner finds something wrong on his car and he has no tool for repairing it, he knows that it is time for him to visit his dealer; and when the dealer has a job of overhauling for which his class of equipment is inadequate, he will in turn refer such work to the nearest distributor or branch with whom he will have a standard working arrangement covered by the terms of his contract.

The same plan will apply to service manuals and each of the five groups will be supplied with accurate and specific detailed instructions for doing the work intrusted to them.

I am accustomed to expressing everything in sales terms. You must therefore permit me to place service in the category of salesmanship. The serviceman is essentially a salesman—in fact, he must be a super-salesman. The new car salesman, generally speaking, sells the customer only one time. The service salesman, on the other hand, must keep the man sold by reselling him time and again throughout the life of the car.

And remember this—the customer is invariably in the best of spirits when he negotiates with the new car salesman, but his transactions with the service salesman are usually under the most exasperating conditions.

#### Sales and Service Activities Must Be More Closely Knitted

The success of a company is primarily dependent upon the adequacy of its sales and service. There must, in the future, be a more equitable working arrangement between these two most important phases of the industry.

Sales and service activities must be more closely knitted. The yarn is salesmanship. The two needles are sales management and service management. With both needles properly working, the knitting will proceed rapidly and effectively and the motor vehicle industry as a whole will continue to move forward toward greater prosperity so long as neither needle is withdrawn.

The salesman must work in closer cooperation with the service department. When the owner has trouble he calls on the service man to remedy it—not the salesman. Therefore, the service department should have something to say regard-

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*On this page, the causes of service*

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ing the claims and promises of the ultra-enthusiastic salesman.

When a salesman resorts to untruths or to promises he knows cannot be fulfilled it is an admission that he is lacking in real sales ability.

The car salesman should not be allowed to let his customer drop immediately after the first sale is consummated. It is not only proper but profitable that he continue his interest in his client and not pass the entire burden on to the service man. In a retail organization where such a policy is followed, the salesman will be more careful in his sales tactics, and disappointed owners will be supplanted with satisfied and permanent customers.

The far-sighted salesman will make it a point to call on his customers from time to time—he will help the service man to keep these customers sold and he will be amply rewarded for the time and effort involved.

Motor cars, in the future, are going to be sold from the back door rather than from the sales floors and across mahogany tables. Those of us who expect to survive keen competition in a permanent buyers' market must get our "house in order."

Let's get down into some of the details.

Inasmuch as we started this discussion from the consumer end, let us next consider the dealer and the garageman, and in this connection let me say that we must stop trying to "pass the buck" to the retail service organization.

### Improving the Dealer's Service Station

While it is generally conceded that such institutions are not efficiently operated, they are not so much to blame as are we who have failed to educate our retail representatives in the proper methods of doing business.

If the retail service station has been inefficient, it is we who are to blame. There is a total of 45,135 automobile repairshops in the United States. It stands to reason that the individuals operating these repairshops do not have the same opportunities to develop proper methods of servicing our products as do we with our elaborate organizations and service specialists.

We must begin to take greater advantage of our facilities and give our dealers the advantage of our best experience.

Let us remember that while these service and repair stations are for the most part operated by individuals not directly on our factory payrolls, they nevertheless work for the same boss that we do, namely—Mr. Car Owner. These independent garages and service shops are not independent after all—they are absolutely dependent upon our product and upon the good will of the public. Many of them are our own dealers operating under contracts which carry mutual advantages.

The most valuable asset of any automotive manufacturing organization is its territorial market. There is a limit to this territorial market. From a standpoint of area, it cannot be increased. A dealer's contract allows him to work a definite part of this territory.

The relation may be likened to that of the landowner who "farms out" his land to the tenant. He has a right to expect that the fertility of the land be maintained and even increased. It is to the best permanent interest of both lessor and lessee primarily to maintain this fertility and secondarily to produce the greatest yields. It is the function of the landlord to assist the tenant in accomplishing this end, giving him the benefit of his best knowledge and experience. If the fertility is depleted, both lessee and lessor suffer alike.

### Three Kinds of Service

Service, in terms of our industry, divides itself into three classifications:

- 1—Parts manufacture and distribution.
- 2—Mechanical repair work.
- 3—Moral or psychological service.

In all three classifications, we need greater efficiency. And when I say efficiency, I don't mean "red tape" and system for the sake of system. When you come right down to brass tacks, there is only one definition of this word "efficiency," and it may be expressed in these two words, "Responsibility Met."

We who have to do with service must meet our responsibility by seeing to it that our dealers carry adequate parts to serve our customers. We must develop scientific methods for anticipating repair parts requirements—both between the dealer and the factory service department, and between the

factory service department and the production department.

Before we can get our dealers to follow our methods, we've got to actually show these dealers how they can make a profit.

The reason that many dealers have failed to make a profit on their parts business is because we fellows back at the factories have guessed at what they needed rather than made it our business to know what they were going to require. The result has been reflected in great volumes of telegraphic orders, express shipments and unnecessary expense to the car owner.

Within our own organization we found through a careful analysis that from 20 to 35 per cent of all repair parts orders during the first six months of 1921 were telegraphic, and that almost 50 per cent of our parts shipments were going forward by express or parcel post as rush orders with a consequent high percentage of errors.

Efficiency is responsibility met. We have not met our service responsibility until we place repair parts within immediate reach of our car owners, even in the most remote sections of this country.

### Keeping Parts in a Usable Condition

Nor is it sufficient that we merely get them there; we must get them there in a usable condition and see to it that the dealer keeps them in a usable condition.

Before we can instruct the dealer on this, we must begin practicing it ourselves. I was in one of our largest factory service departments not long ago and the gaskets for the cylinder heads and crankcases looked as though they had been put in the bins with either a pitchfork or an air conveyor.

I was in another plant where we found that the connecting rods, after having been aligned and inspected, were thrown in a big box with several thousand others, with the natural result that the rods in the bottom of the box were bent out of shape.

In still another factory, delicate electrical parts were being handled and stored as though they were made of pig iron.

Safeguarding the quality and condition of repair parts is of vital importance to our industry. Unnecessary handling is both wasteful and expensive. With the proper development of a unit system for packing, the repeated handling, counting and checking of repair parts, with the damage and waste incident thereto, can be eliminated.

### Anticipating Repair Parts Requirements

Scientific anticipation of repair parts requirements and the distribution of parts on a wholesale basis are necessarily the forerunners of an efficient unit package system and we've all got to come to it.

We have no right to penalize our customers for our own inefficiencies incident to the repeated physical handling of our repair parts. We have not discharged our obligations to the car owner. We have not met our responsibility until we get these parts to him at the right price.

Although the war is over and the price of materials and labor have settled down to a more or less stable level, we are still asking the owner to pay us exorbitant prices for parts necessary to the maintenance of his car.

The completed motor vehicle is designed and built to meet a certain market price, but repair parts for this same vehicle are manufactured on a cost plus basis and any loose ends of operating costs are thrown into the bargain.

We recently made an investigation on a number of cars of representative makes to determine the relation between aggregate repair parts prices and the list prices of the finished products. The ratio ran from one and one-half to two.

Why should it be necessary to get twice as much for a disassembled car as you get for an assembled car? The complete car has a great deal more mechanical labor chargeable to it. There is always an unavoidable breakage of material incidental to the assembly process. It is supposed to require a more expensive type of salesman to sell a finished car and it is usually necessary to demonstrate it before consummating a sale.

The only arguments on the other side of the question are that the repair parts business involves an overwhelming number of detail transactions and that the turnover is extremely slow. I have already answered these objections. The remedy lies in the direction of scientific anticipation of repair stock



## Taking service out of the "goat" class

requirements and in reducing the factory repair parts department to a wholesale basis of operation.

I appreciate the fact that the efficient and profitable handling of a repair parts business must begin with the engineering and manufacturing departments. Every company has a different service problem, depending on number and quality of the models that have been and are being built, quantity of product in the field, quality of dealers representing the company and innumerable other factors.

### Repair Parts Prices

If the organization for which you work is going to change designs every six months and if you are compelled to carry 25,000 to 30,000 different items on your inventory, you are laboring under a serious handicap for which you are not responsible except that you should take a more positive interest in the elimination of those policies which will seriously affect the profits of your department and prevent maximum returns in the form of good will accruing from an efficient service.

And again, most of us are still adhering to the unbusiness-like war-time practice of omitting our repair parts prices from our parts catalog.

It surprises me to learn that a number of companies have even discontinued the practice of supplying owners with parts catalogs.

We, of the automobile fraternity, do not hesitate to spend \$7500 in the big weekly to call our product to the attention of the buyer, and if Mr. Buyer answers the ad, we send him 18 form letters, six folders, a dollar and a half catalog and a liveried chauffeur to take him for a ride in the park—then after he buys the car we refuse point blank to give him a parts catalog, and some of us even go so far as to attempt to charge him for it.

The present-day dealer, in striking contrast—submerged in a multiplicity of models conspicuously free from any and all interchangeability of parts—is in the predicament of having entirely too many parts catalogs. He finds it necessary to refer to a veritable "five-foot shelf" of voluminous literature to ferret out the various serial numbers, parts numbers, pattern numbers, model numbers, car numbers, motor numbers, code designations, historical data references, alphabetical prefixes, differential discounts and war tax schedules, before he becomes a party to the secret of just how much *too much* he is going to have to pay for the blame thing!

And even this isn't the worst of it, for the dealer immediately goes us one better and begins to tack on extra charges covering freight, express, telegrams, handling, overhead and wear and tear on his nervous system.

### Service Department Should Be Operated for a Profit

I am in favor of lower prices and uniform prices on repair parts, but please don't misunderstand me. I am not at all in sympathy with those of you who do not think that a service department should be conducted for a profit, and if you want to earn the status with your respective organizations to which you are entitled, if you want to be looked upon as producers instead of parasites—if you want to be business executives instead of clerks—you've got to look at it just as I do. If you are ambitious for recognition in an executive way, you *MUST* be able to show your results on the right side of the ledger.

Of course, there are two kinds of profits accruing from service: first, the direct dollars and cents profit as it appears on the balance sheet; second, the indirect and intangible profit accruing from the good will of a customer properly served, which is in turn reflected in the sale of new cars.

It is my contention that these two profits are entirely compatible in any manufacturing institution which has an economic reason for its existence.

### A Business Fundamental

Let me get off of the subject of parts prices long enough to lay down what I consider the first fundamental of any business:

The purpose men have in going into business is to make a profit. Since there can be no profit from any business transaction until a sale has been completed, all the purposes of business men move toward their ultimate objective—the *sale of what they produce*. But the fundamental importance of the completed sale is seldom given first consideration when each and every business subject is studied. Broadly speaking, the first thought of a business man about any phase of his operations or any contemplated project should be—"How will this affect sales, and how can I turn this to best advantage in increasing profits through sales?"

It is not surprising that many of you have been unable to show a dollars and cents profit. The service department has always been looked upon as the goat of the whole industry.

I realize what some of you have been up against.

Take this matter of parts being replaced under your guarantee and policy accounts. I wonder how closely you follow your replacements and complaints.

Do you issue regular reports covering such items in order that your organization may get a true reflection as to the quality of the product? Do you know how much such replacements are costing you per automobile?

What is being done about it? Is the cost decreasing or increasing? What department is being charged with these costs?

Unless you are thinking in terms of profits and disseminating data of this kind among the proper departments of your organization, you have not met your responsibility—you are not doing your duty as service managers.

Such replacement reports coupled with summarized complaint correspondence should serve as a barometer on the quality of your product at all times, and in the absence of such reports you are paving the way for a condition whereby the purchasing agent or the engineer might persist in practicing a false economy that might save the company five cents on the price of a car and cost five dollars a car for gratis replacements, not to mention labor costs and inconvenience to the owner.

If the production has too much material of a certain kind, they try to pass the buck by turning it over to you service men; whether you need it or not.

Let me say right here, that if you thought more about profits and turnovers you would not stand for this sort of thing three seconds! If you *do* let the production manager slip it over on you, it's really your own fault—as a matter of fact, you are his customer and if you were functioning properly you'd be telling him how much stuff you wanted, when you wanted it, and how much it ought to cost. You would refuse to act as a dumping ground for surplus and inferior material, and you would insist on an accounting system that would properly distribute expense which your department incurs as a result of unsound engineering, careless manufacturing, inadequate inspection or a liberal replacement policy on the part of the sales department.

And then again, when material is scarce and the new car market is on the boom, the whole process is reversed and you are expected to render service on air while the new car production has the right of way.

### Keeping the Old Cars Running Is More Important Than Building New Cars

We have just inaugurated a policy within General Motors, handed down from the president through the executive committee, that provides for service parts requirements being given precedence over production requirements, first, last and always—irrespective of the new car orders on file—and without consideration for any temporary financial loss.

We have arrived at the very sound conclusion that keeping



the old cars running is of far greater and more lasting importance than the matter of getting the new cars sold.

The old car owner must be given first consideration, if we expect to get new car owners. The repair parts phase of the industry must be conducted for profits, but these profits must come through greater efficiencies all along the line, rather than by the maintenance of prohibitive repair parts prices.

Service must no longer be confused with free repair work. The owner wants cheaper transportation rather than cheaper automobiles or "free" repair work.

Service doesn't mean giving goods away, but it does mean seeing to it that the ultimate consumer gets 100 cents worth of value for every dollar that he spends.

As applied specifically to the motor vehicle industry, service may be defined as a summation of those constructive efforts on the part of the manufacturer and the dealer that enable the owner to get the maximum return from his investment.

In this formula, the time element is an important consideration. The cost of a repair part is in many instances negligible as compared with the expensive delays involved. All other things being equal, or anywhere near equal, the usefulness of any automotive product is inversely proportional to the time lost by the owner on account of repairs.

### Mechanical Service

Efficient mechanical service on the part of the dealer is of prime importance. It is not enough that he be able to just "fix" a car so that it will run—he should possess the knowledge and facilities for turning out work that would pass the most rigid factory inspection. He should have equipment proportionate to his service requirements. He should have special tools for those operations peculiar to the particular car that he represents, unless he is a very small dealer, in which case he should have a working arrangement with his distributor on overhaul jobs which he is not prepared to handle.

Here again the responsibility rests with the manufacturer. It is the business of the factory service manager to develop or to have developed special tools and service fixtures for the use of the dealer and distributor and to see to it that such equipment is properly used.

The dealer must be shown how to lay out his shop properly. The stationary equipment should be located with a view to increased efficiency and the hand tools should be kept in special tool racks where they may be readily located instead of thrown helter-skelter around the shop. The owner must not be penalized for inexcusable lack of efficiency.

If the service manager does his duty in this direction, repair work will gravitate to our regular dealers instead to the back alley garage.

### The Flat Rate System

It is my prediction that within three years every reputable repairshop in America will be operating on some form of flat rate system. Whether we like it or not, we've got to come to it, and when we do come to it we'll be surprised at just how low our past efficiency has been.

In our factories we know just how long it takes to do a specific operation, and the exact cost of the material and labor involved, whereas on the other hand, our service stations refuse point blank to tell a man what a repair job is going to cost him, and, as a matter of fact, they seldom charge any two people the same amount for doing the same job.

To me the necessity for standardizing repair operations is so obvious and so simple of accomplishment that it makes me mad when I hear a service manager say that it is impractical in connection with his particular product.

I'd like someone here to tell me the difference between putting on a steering knuckle in a factory and in a service station in so far as the problem of cost analysis is concerned.

### Moral or Psychological Service

And next we come to our third classification of service, namely, moral or psychological service.

In addition to the tangible repair parts distribution and mechanical phases of our service activity, there is this intangible moral phase.

In the future, we are going to see this thing that I choose to call moral service assume an ever-increasing importance.

It will project itself through every phase of our service activity. Our boss, the car owner, is already demanding it;

he has been meek and long-suffering, but his patience is just about exhausted.

Take the matter of keeping cars clean in a repairshop. A man may bring his car into your service station ever so dirty, but this does not license you to turn it back to him in a still more untidy condition.

In the first place, the repairshop itself should be kept clean and there is no necessity for the mechanic wearing the same overalls throughout the season without washing. A clean repairshop is one of the dealer's best advertisements.

A repair job should never have a "finish" tag put on it until the body interior has been dusted out and the steering wheel wiped off.

When the bill for a repair job runs over \$15, I would say that the dealer should give the owner a wash and a polish free of charge, and he'll find it the best investment he ever made.

If I sent a coat to a tailorshop to have a button put on or a rip sewed up and the tailor spilled a can of machine oil on it or let his dog use it for a bed I would raise the dickens, and so would you; and yet every day cars are being turned out of our "authorized service station" so greasy and mussy that after you're ridden around the next block you're a fit candidate for a Turkish bath.

Even our finest closed jobs are not immune—in fact, the average mechanic seems to fairly revel in the joys of disseminating grease and oil on a broadcloth interior—he may miss the universal joints, the transmission and the differential, but the front cushion and the steering wheel—N-E-V-E-R!

Manufacturers have made much progress during the past five years in the development of enclosed jobs with piano finish and luxurious appointments. The most painstaking care is used in the selection of the proper material for the cushions, carpets, curtains, etc., but the average garage mechanic, on the other hand, has not yet learned to appreciate the difference between a \$10,000 limousine and an ordinary truck.

### Must See Beyond Mechanical Side of Repair Work

Any man who does not see beyond the mechanical side of a motor car does not belong in a garage or service station. He is of the age when automobiles were merely machines to get about it.

The most adequate parts stock and the very best mechanical equipment is of no avail if the policy is wrong and the methods unbusinesslike.

### Projecting Sales Into Service

Sales psychology must be injected into service. We have no right to make a man wait two hours for his bill after his car is ready for delivery. And when he pays this bill the man who takes the money should have enough sales sense to say "Thank you."

Even if the remittance is by mail, the bill is not properly receipted until the words "thank you" are written across its face in long-hand.

When winter approaches, it is the dealer's duty to warn his owners and offer his services in the matter of putting antifreeze solution in their radiators and light oil in their motors, etc. And in the spring it is his business to look after changing back for warm weather operation.

These things are details, but they are of vital importance, nevertheless.

To be successful, a service station must be conducted with a proper observance of the fundamental rules of psychology, common sense and decent business practices.

A strict observance of office hours should be taboo in any automobile repairshop. The biggest volume of sales on minor repair parts and accessories are made and the greatest good will is built between 5:00 p. m. and 9:00 a. m., during the noon hour, and on holidays.

If we expect to continue doing business with the big market, represented by salaried employees, we must prepare to serve him, as and when he wants to be served.

The other day one of my associates drove his car into the factory service station of one of the largest Detroit manufacturers at 7:45 in the morning, and despite the fact that a dozen or more employees were loafing around, he could not find anyone willing to talk business with him until one minute after eight.

Another car owner, a man quite prominently identified with



the trade, was in my office last week and told me of his futile efforts to break up a crap game and get a stock clerk to condescend to sell him a radiator cap during the noon hour.

#### Service Manager Should Get Out Into the Field

The factory service manager should spend more time out in the territory studying the problems of the dealers and assisting them in the development of more efficient and uniform methods.

Service is being weighed in the balance and it is found wanting. Haphazard methods cannot survive. Service will be reduced to a uniform science. We must teach the dealer how to conduct his service at a profit and at the same time reduce the costs to the car owner.

After we have developed the proper methods, it will then be our business to check up our dealers in order that the good will of the car owner and hence the future profits of the industry may be insured.

I could relate dozens of similar incidents, and if any of you men question my statements, it is proof to me that you are not spending enough of your time out on the firing line. Let me suggest that each of you make a test on one of your own branch houses and see if you don't find something just as bad or even worse—and if your own branches are being so loosely operated under the false banner of Service, is it not even more imperative that we instruct, assist and check up our independent dealers?

Let me cite you an example of one of our own branch houses, located in a city wherein almost three thousand cars of the particular make are in use.

This branch house was built to be the most modern and complete institution of its kind.

But out of the three thousand cars within its direct range, an investigation showed that it was servicing only about thirty cars a day.

An analysis of the situation showed that, as a result of inefficient management and a surplus of incompetent mechanics, the customers became so dissatisfied and complained so much that the better mechanics all quit their jobs and organized independent shops of their own, taking their customers right with them.

As an index to the amount of business that had gravitated to them, an audit of the factory repair parts accounts showed that these independent shops which had been opened by retiring employees were purchasing twice as many parts per month as were being consumed by the factory branch.

With the inauguration of a new management and the adoption of sound business policies and efficient methods, this branch is rapidly recovering its repair business and is at the same time servicing from ninety to one hundred cars per day.

#### Checking Up the Factory Service Department

I would also suggest that you check up the service departments of your own immediate organizations, and when I say service departments, I mean far more than the routine activity between the four walls enclosing the employees for whom you are directly responsible.

You must consider every phase of activity connected with your institution before you can get a true perspective of the service end of your business.

We have been conducting an investigation of the service departments of all General Motors passenger car divisions in collaboration with our respective service managers.

I'll read you just a few of the items that we are covering:

1st. Service problems peculiar to product. Age of company, number of models built to date, quantity of product in the field, number of items on repair parts inventory, value of repair parts inventory, volume of repairs parts sales, volume of repair parts replacements, service cost expressed as a percentage of net car sales, number of branches, distributors and dealers.

2nd. Physical layout of stock bins, packing and shipping facilities.

3rd. Methods of estimating repair parts requirements.

4th. Cost of operating service department.

5th. Basis of pricing repair parts.

6th. Structure of service department and its relation to other departments.

7th. Methods of handling production orders for repair parts stock.

8th. Cooperation rendered to other departments by service department, particularly in connection with the dissemination of data on complaints, replacements, etc., reflecting on the quality of the product and hence serving as a guide to engineering and manufacturing departments.

9th. Methods of handling repair parts orders from customers, dealers, distributors and branches.

10th. Educational activity for the production of more intelligent service on part of dealer, and a more intelligent operation on part of owner.

11th. Methods employed for getting distributors and dealers to carry adequate stocks.

12th. Expediency with which orders are filled.

13th. Accounting systems employed.

14th. Financial status of service department.

15th. Methods of handling parts returned for replacement.

These are only a few of the things that we consider pertinent to a service analysis. The questionnaire that we are using covers a total of 192 items.

#### Service Must Be Improved

Generally speaking, service in the automotive industry has been handled in a careless and inefficient manner. In the majority of cases, it has been looked upon as a necessary evil—a side issue, subordinate to the major activity of building and selling complete units. It has been developed—or rather it has "grown up" in a hit-and-miss sort of fashion and has never had a share of recognition and sympathy proportionate to its importance. Most of us have depended too much on the sales of new cars to new customers, through new and spectacular advertising schemes, with ever changing models marketed through a new crop of dealers each season.

#### Future Business Depends on Service

As a product attains a wide distribution the prospective purchaser becomes more or less immune to our advertising and sales activity and more and more under the influence of his friends who have had experience with the product in question.

We must sell service first and motor vehicles second. No matter how perfect the design and workmanship of so intricate a product as a motor vehicle, it cannot and will not stand up and give a satisfactory account of itself unless it is kept in first-class condition through systematic inspection, adjustment and parts replacements. And by the same token, even a second-rate vehicle can be kept going beyond its normal life if it is properly serviced.

The automotive industry leads all others in the fields of scientific research, invention, engineering, processing and manufacturing. The efficiencies and economies exercised in our modern plants are the standards of the world, but the injection of similar standards and efficiencies into our marketing and servicing methods is yet to be accomplished.

In the future automobiles and the service that must inevitably follow will have to be sold and sold hard—our most valuable allies are the 9,000,000 car owners whose continued good will rests largely in the hands of you service men.

The new era is bringing with it new standards, and right today the car owner and the prospective car owners are comparing our service with the service of the department store, the drug store, the jewelry store, the restaurant and other well regulated institutions.

In the future, permanent satisfaction to the owner is the rock upon which we must build. Service is destined to play a most important role in the success or failure of every manufacturer.

And remember that "He profits most who serves best."

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*Of course, you are a better dealer for having read this*

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# A. E. A. Delegates Prove By Orders That Business Is Better

## Constructive Session of Convention Is Featured by Buying and Enthusiasm Over the Merchandising Plans

**I**N ACTIONS and in money, which ever talk more convincingly than the most silvery speech, jobbers of the United States and Canada showed their faith in the future of the automotive equipment business and in the sales promotion campaign, which already has begun to make it a better business, at the annual convention and show of the Automotive Equipment Association, which concluded a five-day session in Chicago last Saturday.

Manufacturer members, 200 of whose exhibits filled the Coliseum and Annex, did more business on the floor than at any previous exhibit—far more, particularly, than a year ago.

The jobber members who patronized the exhibits presented an optimistic front, which was in sharp contrast to the prevailing sentiment of the 1920 convention.

And both manufacturers and jobbers, crediting the sales promotion campaign inaugurated at the Mackinac Island meeting in July with some of the sales stimulation which rests on the general foundation of countrywide improved business conditions, pledged their continued support of the campaign and made plans to extend its influence immediately over all sections of the country.

Machinery also was set in motion to apply the sales promotion idea, so far limited to accessory products, to garage equipment and tools. The campaign, to date, has consisted of an effort to show the dealer and garageman the profit opportunities in automotive equipment merchandising and to assist them to turn these opportunities into money in the cash drawer.

The campaign slogan, "Ask 'Em to Buy," has been

carried to the dealer by the jobber salesman, who has been demonstrating that goods on the dealer's shelves are liabilities, and the only way to turn them into assets is to ask people to buy them. Now it is planned to tie up with the campaign a program of education of jobber salesmen on right methods of selling shop equipment and of dealers and garagemen on the profits for them in use of labor and time-saving devices.

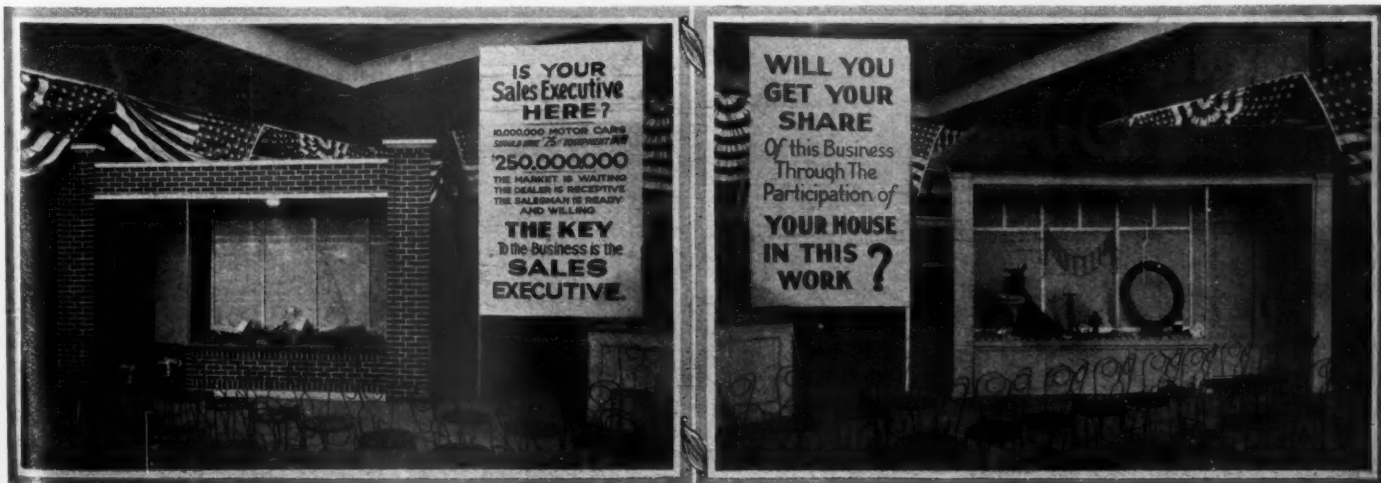
The details of this program are yet to be worked out, but action is to be obtained right away.

The convention enthusiastically endorsed the program laid out and already carried out in several sections of the country by Ray W. Sherman, the merchandising director. Sherman's address telling how the sales promotion idea is being carried to groups of jobber salesmen and dealers and relating practical results already obtained by increases in the automotive equipment of dealers who have "asked 'em to buy" was the inspirational high light of the convention.

What Sherman said was reinforced by an interesting and practical motion picture, "Ask 'Em to Buy," which showed a jobber salesman telling the better merchandising story to a garageman, showed the garageman carrying out the idea, and visualized the results in more profits for the garageman and a better customer for the jobber salesman.

The "movie," from which several duplicate films already have been made, will be shown to jobber salesmen and dealers throughout the country as a supplement to sales promotion talks to be given by Sherman and representatives of manufacturing and jobbing houses.

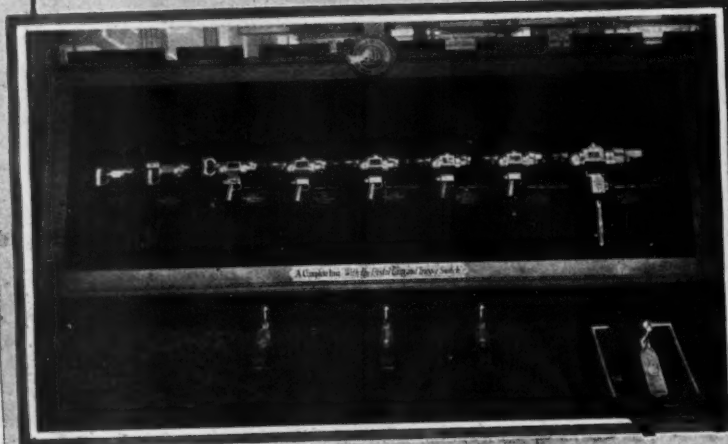
The sales promotion work had a direct effect on the association's business exhibit. It seemed to inspire more effective



Examples like the above of good and bad window display carried a forcible message to the delegates of the A. E. A. convention in Chicago that left a far more lasting impression than could verbal barrages without such display



*Exhibits at A. E. A. Convention Were a Vote of Confidence in Future Business*





sales talks to jobbers by manufacturers' representatives and more confidence on the part of jobbers in the wisdom of their decisions to begin replenishing stocks which have been going through a steady depletion process for more than a year. Virtually all manufacturers reported exhibit sales far in excess of last year's. One exhibitor, for instance, did \$42,000 worth of business in one day.

When Commissioner William M. Webster, just before adjournment, asked the delegates if they had a good convention, if they were satisfied with results in the way of inspiration, information and business, and if they looked into the future with more confidence than they did a year ago, the answers were shouted unanimously: "Yes, yes, yes!"

Talks with jobbers from all sections of the United States and Canada brought out two facts of large significance:

First, that sales to the retail trade, which usually begin to drop off in September, have been on the upgrade since the first of October.

Second, that the year's automotive equipment turnover of the average jobber is about 85 per cent of last year's in tonnage and 70 per cent of 1920 in dollars and cents volume, the difference being due to price reductions.

An additional note of interest was found in the statements of jobbers who have departments wholesaling lines other than automotive equipment, that business in these lines this year will aggregate only about half that of 1920.

The convention and show attendance was the largest in the association's history, fully 1,000 men being present. Delegates and alternates at the convention numbered between 500 and 600.

The association voted to hold the 1922 convention and show at the same place Nov. 13-18, when it expected that the second, as well as the first floor of the Coliseum Annex will be required to house the exhibits of members, some of whom were crowded out this year. The summer convention will be held at Colorado Springs June 19-25.

## Sales Promotion Plan Gets Hearty Reception from Convention

**S**ALES promotion—the idea, what has been done with it, what can be done with it to broaden the outlet for the products of the automotive equipment industry—was the dominating issue of the convention.

The sales promotion movement, which was given life at the Mackinac Island meeting in July, came into the Chicago meeting with an account of its stewardship and with a plea for renewed leadership by both manufacturer and jobber members of the association which will make possible its continuance and expansion, for the benefit of motor car and truck owners and for the profit alike of manufacturers, jobbers and dealers.

In words and pictures the A. E. A. was shown what the sales promotion movement has done in three short months, and what it can do in the months and years ahead if the trade will continue and strengthen its support of the idea.

In words, the sales promotion story was presented by Ray W. Sherman, merchandising director of the A. E. A., the man in charge of the development of the idea and the work to put it into effect.

In pictures, the convention actually saw the sales promotion work under way in 2000 feet of motion picture film, which showed how a jobber salesman, key man of the whole sales promotion plan, transformed a garageman from impending failure to assured success by demonstrating not merely the possibilities of profit, but the actual profits in automotive equipment merchandising as it can be practiced without expensive help or expensive sales facilities in the average garage or dealer establishment.

### IT IS A TRUE STORY—NOT FICTION

And the "movie," which was a spontaneous hit, as the theatrical reviewers would say, is going out of the circuit as a silent salesman of the sales promotion idea, to help Director Sherman and representatives of manufacturing and jobbing houses show the retail trade that they can increase their automotive equipment sales by showing them how it is done.

### NEW MEMBERS ELECTED INTO A. E. A. MANUFACTURERS

American Bosch Magneto Corp., Springfield, Mass.  
Outlook Co., Cleveland.  
Air Reduction Sales Co., New York.  
Walker Accessories, Inc., Chicago.  
Farran-Kinney Mfg. Co., Chicago.  
The Benzer Corp., Brooklyn, N. Y.  
J. D. Bridges Co., Florence, S. C.  
Sparks-Withington Co., Jackson, Mich., rejoined.

### JOBBERS

Joseph Schwartz Co., New Orleans.

More about the moving picture later in this article, but right here it should be said that it is entertaining and it is convincing, because while the acting is professional, insuring theatrical technique, the story is based on fact—on the experiences of a jobber salesman and one of his customers in Florida, who had tried something and done something with sales promotion, as had many jobbers, their salesmen and dealers, long before the sales promotion program was inaugurated.

When the word and picture presentation of the sales promotion idea had been completed, at the opening session of the convention on Monday, comment among the manufacturers and jobbers and their sales executives who heard and saw it was unanimous that the idea first sold at Mackinac had been resold in a manner many times as effective. This comment was a tribute partly to Director Sherman's effective presentation of the undertaking, partly to the handling of the undertaking up to date by Sherman and the special sales promotion committee, and partly to the soundness of the program itself, which contemplates an organization of the industry to educate itself—manufacturer, jobber and retailer—in better merchandising methods.

The sales promotion program is built around the request that the manufac-

turer and jobber is making of the retailer—"Ask 'Em to Buy." It doesn't call for any offense against the public; it doesn't call for anything freakish in the activities of manufacturers, jobbers, dealers or their sales representatives. It is based on the oldest of sales fundamentals—asking people to buy merchandise.

### IT IS A PLAN OF COOPERATION

Director Sherman concluded his presentation with a direct appeal to manufacturers and jobbers for real leadership in the campaign—their campaign and the industry's campaign.

Of the manufacturers he asked:

1—That they do everything possible to make their products saleable by putting into them the greatest possible value and utility, and that they get into their advertising information as to how the dealer can sell the product instead of merely telling him what it is and how good it is.

2—That they give the campaign the active support of their sales representatives, who, he said, should supplement the work of the association in carrying the promotion idea to jobbers and their salesmen, and should back up jobber salesmen, wherever possible, in putting the story before the dealers.

Of the jobbers he asked:

1—Active participation by their sales executives in the campaign, to assure the jobber salesmen that their employers are for the movement and the salesmen's participation in it.

2—Cooperation with the merchandising department of the A. E. A., and with state, county and local dealer associations to utilize all possible gatherings of automotive men to carry on the "Ask 'Em to Buy" propaganda.

Sherman made it plain that no field organization of the association, no matter how extensive it might be, could make the campaign move. He conceded that the jobber salesmen must do the





The Manley Mfg. Co. exhibited a small model of a service car equipped with its devices and a miniature Manley "Work Under"

greater part of the work of showing the dealer his automotive equipment sales possibilities and helping him to realize on them. He rated the jobber salesman as the most effective agency for carrying out the final details of the campaign. But he was equally frank in declaring that the work can be a thorough success only with the burden of carrying it on resting primarily on the shoulders of the membership of the association, and he appealed to the membership to assume the burden and carry it in such a way as to provide substantial leadership for the campaign.

#### STRANAHAN SEES IMPORTANCE OF WORK

Sherman was introduced to the meeting by Robert A. Stranahan, retiring president of the association and chairman of the permanent sales promotion committee. He said the sales promotion work was the most important ever undertaken by the association. He said it could succeed only if every member had his organization working for it. With such support, he said, the campaign promised substantial increases in business.

Sherman's previous addresses, since the campaign started, have been directed toward interesting jobber salesmen in the movement and showing them how they could pass the story on to their dealer customers—to their own and the dealers' profit. His convention address was a talk direct to heads of manufacturer and jobber houses, presenting the picture of the campaign from the standpoint of the employers' part in it, in directing and encouraging salesmen and helping them to interest dealers.

#### \$25 IN SALES FOR EACH OF 10,000,000 CARS

Sherman put the annual possibilities of the automotive equipment business at \$250,000,000, based on an estimate of \$25 per car for 10,000,000 cars in the United States and Canada. Only dealers—car dealers, repairmen, garagemen and gas and oil men—can get this business from the car owner, and because many of them

have been "keeping their mouths shut," he pointed out, they haven't been getting business in anywhere near possible volume, hence the necessity for the sales promotion campaign to get the retail trade to "Ask 'Em to Buy" and break down the dam that has held back the logical flow of merchandise.

Sherman said many dealers' idea of selling merchandise was to have it on their shelves so that they could meet the demands of people who asked for it. The problem of the industry is to get these goods off the dealers' shelves, hence the advice to "Ask 'Em to Buy," which has a how to do it feature in contrast to the mere injunction to "sell."

The merchandising director then explained the background and detail of the campaign which has been described in previous issues of *MOTOR AGE*, telling how suggestions for expensive field work by a big staff and for mail effort directed to the dealer had been rejected in favor of approach through the jobber salesman, who knows the dealer, has his confidence, can see him frequently and who knows the local market and its possi-



Part of the film depicting the struggles and eventual success of a garageman. The jobber plays the hero

bilities. He said a headquarters field staff to interview dealers would cost \$10 a dealer—\$750,000 a year—to see dealers once a year, which he classed in the same category of uselessness as running a page of advertising once a year.

So the campaign is organized on this basis:

1—The merchandising director and one or two assistants are covering the country as fast as possible, showing groups of jobber salesmen, at meetings, how to get the plan before dealers. Dealers also are included in meetings, wherever possible, and already more than 2000 people in the wholesale and retail trade have heard the story.

2—The merchandising director's talks hereafter will be illustrated with the film, "Ask 'Em to Buy," as will the talks of his co-workers, including jobber and manufacturer executives and salesmen, whenever any of the association or privately owned films are available.

3—Headquarters and member representatives will speak at state and local dealer association meetings and at gatherings of dealers during the show season.

4—The *Leader*, bi-weekly publication of the A. E. A., will keep the movement before members, and the *Automotive Equipment Merchandiser*, four-page bi-weekly of the campaign, will tell and retell the story to salesmen of both manufacturer and jobber members.

5—The prepared "Ask 'Em to Buy" talk will be furnished to members and their salesmen who will use it to address dealer meetings.

6—The manual on automotive equipment merchandising, "A Better Business," will be furnished to dealers who ask for it, at 15 cents a copy.

#### THE "MOVIE" HOLDS ATTENTION WITHOUT THRILLS OR VAMPS

If such a thing were possible it would have been a treat to have watched the faces of the A. E. A. men who sat through the motion picture "show," which is to help carry their sales promotion story to jobber salesmen and their dealer customers throughout the country. The film contained no vamp nor thrills, but there were men, women and a child or two in it, all doing the ordinary, yet interesting, things that ordinary people do; yet fitting into parts in an entirely plausible and practical story of the awakening of a garageman to the profit possibilities in automotive equipment merchandising.

A jobber salesman, of course, did the awakening—showed the garageman how to "Ask 'Em to Buy"—and while two reels of film were whirled off, the audience saw first the jobber salesman and then the garageman sell various items of accessories and replacement equipment to motorists who drove up for gas. These men of the industry also saw the garageman progress by two stages to



ownership of "the biggest garage in town" and marry the girl he feared he was going to lose when the story began because he couldn't make enough on his repairwork to support a wife. Traditionally, the garageman and the girl were married and lived happily after, as indicated by the comedy conclusion of the film, which showed a very much occupied baby carriage, "completely equipped," as the automotive men put it, with windshield, spotlight, bumpers and numerous other accessories.

#### PLOT FROM REAL LIFE

Sherman announced that the plot of the film had been obtained from Ike Doherty, a salesman for the G. Norman Baughman Co., Tampa, Fla., jobber, who had found a garageman in about the same straits as the principal character in the film, "starving to death" on meager profits of his repairwork and down in the mouth because he couldn't get married.

Called to the convention platform, Doherty insisted that he had done just what any other jobber salesman should do for any customer who needed assistance along merchandising lines. His story, which emphasized Sherman's statement of the source of the plot, was enthusiastically received.

#### MOVIE WILL BE ROUTED BY STATE VICE PRESIDENTS

Machinery to take the sales promotion work promptly and thoroughly into all sections of the country was created by merging the former state vice presidents and the committee on assistance to the retail trade into a committee of state vice presidents, headed by the vice presi-

#### Future Meeting of the A.E.A.

The summer meeting will be held at Colorado Springs, June 19-25.

The 1922 annual meeting and show at the Coliseum, Chicago, November 15-20.

dent of the association. The state vice presidents will be responsible for circulation of the "Ask 'em to Buy" movie and for arranging meetings of jobber salesmen and dealers to be addressed by the merchandising director or his representatives or by local or district speakers. The state vice presidents will appoint district chairmen from the various jobbing centers to work under them.

Director Sherman held a meeting of the state vice presidents, which resulted in plans to route the six movie films through Canada and the several sections of the United States, and in arrangements for speaking tours by Sherman to the Rocky Mountain and Pacific Coast districts before the holidays, and in the Middle Western territory at holiday time. Other routes are partially planned.

The Southern Automotive Equipment Association bought a film for its own use and several individual jobbers and groups of jobbers have ordered them, also, to promote shop equipment sales.

Interest of garage equipment manufacturers in the sales promotion work was indicated by the attendance of members in this class at a conference with Director Sherman. The manufacturers, while conceding that increase of dealers' and garagemen's profits through selling more accessories would make them naturally better shop equipment customers, desired to help the merchandising department work out plans to show the profitable uses of equipment to the jobber salesmen who must sell it and the dealers who may buy it. The conference did not reach a definite conclusion, but it was agreed all around that special activities along this line would be undertaken.

## Much Business Before the Convention

THE convention was advised that the association will be ready to distribute, about March 1, a universal catalog, intended for the desks of buyers for jobbers, in which will be listed and illustrated the products of manufacturer members. The catalog will be copyrighted, issued free to members—manufacturers and jobbers—and will be made up on a basis of about \$25 per page for manufacturers cooperating, with a rebate if the cost is less. It will be a cooperative book in every way, and, in addition to being a handy reference for buyers, is expected to prove of assistance to jobbers in making up their own catalogs. Members will be able to obtain extra copies at cost. The catalog is being worked out by a committee headed by William Von Elm of the E. A. Laboratories, Inc., assisted by Charles P. Hughes, A. E. A. secretary of committees.

#### FREIGHT EQUALIZATION PLEA

At the manufacturers' divisional meeting the members gave attention to the suggestion of a jobber that freight charges be absorbed or equalized so that jobbers at varying distances from the centers of manufacture would not be placed at a disadvantage in handling nationally priced items. A case was cited where the freight on an article made in the East, delivered to his door, cost a Newark, N. J., jobber three per cent of the selling price and a Los Angeles jobber 27 per cent. Numerous manufacturers either are absorbing the freight or have worked out an equalization schedule, and it was the sense of the meeting

that individual manufacturers do everything possible to find means of overcoming the inequalities prevailing.

#### "WHOLESALE ONLY" MEMBERSHIP RULE MADE ELASTIC

At the jobbers' divisional meeting there was a vote of 104 to 72 in favor of allowing the membership committee to use discretion in interpreting the rule adopted a year ago that only jobbers do-

ing an exclusively wholesale business can be admitted to the association. Since the A. E. A. was formed, when many of the jobber members had retail departments, there has been a strong trend toward "wholesale only," which led up to the rule adopted last November. But the majority felt that the proposal would help build up the association and improve competitive conditions in some localities. The convention, as a whole, concurred in the proposal.

#### A TOUCH OF SENTIMENT

There was an echo of the Mackinac Island meeting at the jobbers' session, when A. V. Fagerstrom of Pueblo, Colo., took the platform to thank the association for the aid extended him in getting his business on its feet after the flood that wiped out his entire stock and equipment. Fagerstrom, it developed through a statement of Commissioners Webster, had tried to give notes for some of the funds and credits advanced to him—approximately \$17,000 in all—but the commissioner had told him the members were not "that kind of people." Fagerstrom spoke with deep feeling of the fellowship of the association in a time of need.

#### WORK OF TRAFFIC BUREAU

The Association's Traffic Bureau has obtained for 69 members during the year \$4600 in freight overcharges. Its work is to be broadened, and among other things an effort will be made to bring about an amendment of railroad classifications which gives shippers of wagon parts an

#### NEW OFFICERS AND DIRECTORS OF THE A. E. A.

President, Howard M. Dine, Dine-De Wees Co., Canton, O.

Vice President, C. C. Gates, Gates Rubber Co., Denver, Colo.

#### DIRECTORS

W. L. Moncur, Cutten & Foster, Ltd., Toronto.

G. Norman Baughman, G. Norman Baughman Co., Tampa, Fla.

Howard M. Dine, Dine-De Wees Co., Canton, O.

D. A. McConnell, Klax Co., Newark, N. J.

W. T. Morris, American Chain Co., Bridgeport, Conn.

W. C. Hecker, Curtis Pneumatic Machinery Co., St. Louis, Mo.

C. F. Hodgson, Weaver Mfg. Co., Springfield, Ill.

E. V. Hennecke, Moto-Meter Co., New York City, N. Y.

Fourteen other directors are holdover members of the board.

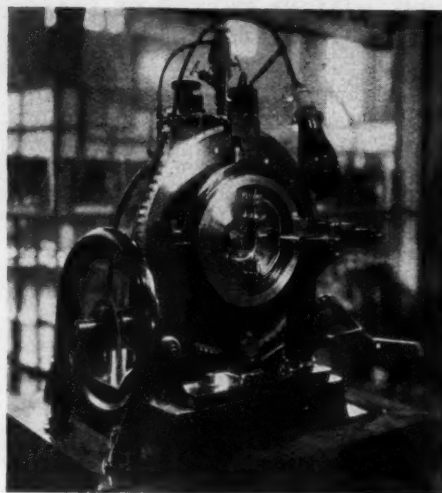


advantage over firms shipping automobile parts.

#### PLAN TO TEST REPLACEMENT PARTS

The convention referred to the board of directors a suggestion that a technical laboratory be created to pass upon replacement parts products of the industry and stamp those passing the test with the association's approval. The proposal was made as a means of strengthening competition with replacement parts makers whose products are claimed by car and truck manufacturers to be actually, as well as technically, in the "pirate" class—that is, of inferior quality.

It was brought out that the replacement of vehicle parts has reached a volume of \$400,000 a year, of which the car and truck manufacturer naturally does and will continue to do a considerable part, but of which independent manufacturers, in the opinion of members who spoke, are entitled to a share commensurate with the quality of their products.



The American Hammered Piston Ring Co.'s ingenious peening machine. The peening extends entirely across the width of the ring and each peen mark is a uniform distance from the next peen mark. This tends to produce uniformity of tension through the ring.

handle them instead of letting them remain the "property" of individual salesmen, will "quit worrying about a contract and sell merchandise that he has faith in as long as he likes the factory policy and the factory likes his representation," and will know his business, thus winning financial support, attracting competent help and selling goods.

Of the manufacturers Hearn said: "You say the factories compel you to trade. Can you call yourselves business men when you let someone run your business? You ought to run it yourselves or get out."

Annual dues in the new association were fixed as follows: distributors, \$50; dealers, \$35; jobbers, \$40; accessory dealers, \$25; repairmen, \$15; associate members, \$10. The dues of distributors and dealers include \$10 for membership in the N. A. D. A.

The association expects to employ a full-time secretary-manager, and headquarters probably will be in Harrisburg. Officers, directors and committees were elected as follows: president, George C. McFarland, Harrisburg; vice-president, J. B. Arbuckle, Erie; treasurer, E. A. Clark, York; temporary secretary, Roy W. Shreiner, Lancaster; financial secretary, Harry Schroeder, Lancaster. Directors: E. T. Satchell, Allentown; T. F. Dunn, Pittsburgh; A. E. Maltby, Philadelphia; J. M. Kalbach, Reading; George S. Bray, Wilkes-Barre; J. G. Adams, Uniontown; O. R. Conrad, Scranton; J. E. Lowe, Butler; E. C. Davis, Sharon; H. H. Harkins, Lebanon; R. K. Russell, Warren. Executive committee: Messrs. McFarland, Arbuckle, Clark, Maltby and Conrad.

The convention was welcomed to the statehouse by Lieutenant Governor Beideman and State Highway Commissioner Sadler.

### Pennsylvania Automobile Assn. Organized with Prospects of Great Benefits to Its Dealer Members

**H**ARRISBURG, Pa., Nov. 19—The two-fold purpose with which the convention for organizing the Pennsylvania Automobile Assn. was inspired grew into a broader and higher plane before the organization was completed at the state capitol in Harrisburg, Nov. 10-11.

Details of the organization were conducted by Harry G. Mooock, general manager, and P. F. Drury, assistant general manager of the N. A. D. A.

Discussions during the convention developed the fact that the state association idea is not an expedient to attempt to solve legislative problems affecting the trade. As a matter of fact, the Pennsylvania legislature does not have another session until the winter of 1922-23, and the plans for action along legislative lines, as well as for trade cooperation, which were developed, were plainly the result of thought not merely of today, but of the years to come.

There was no thought expressed that the association would be able to solve the used car problem, or make dealers' relations with manufacturers 100 per cent satisfactory; but there was recognition that exchange of ideas and cooperation would help to lighten the various burdens of the trade, and the delegates present signed checks for annual dues ranging from \$50 down, as tokens of their belief in the association idea.

The meeting itself developed a valuable exchange of ideas through addresses and an open forum. Speakers included Harry G. Mooock, P. F. Drury, Wayne Hearn, who is doing educational work in dealer organization throughout the country; Alfred Reeves, general manager of the National Automobile Chamber of Commerce; Harry Meixell, Jr., secretary of the Motor Vehicle Conference committee; Neal G. Adair, editor of Motor World, and A. V. Comings of the Automobile Trade Journal.

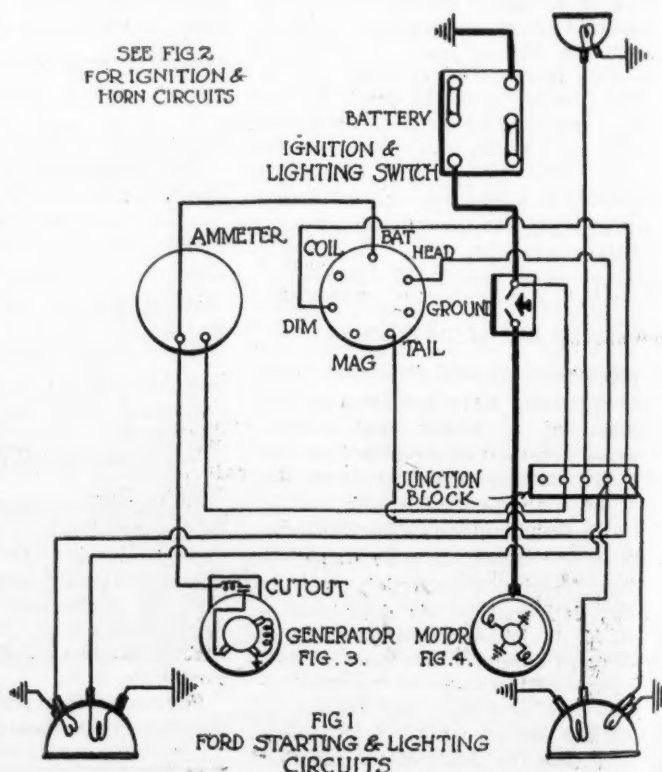
Hearn made some statements about

"the 1922 dealer" which, despite their somewhat surprising nature to some of the delegates, were vigorously applauded. Hearn said he looked for many changes in the industry between now and the end of 1922, and said that dealers who "see it through until 1923 will be set up for life."

Hearn declared that the 1922 dealer will have a keen appreciation of honor, will tend toward becoming an exclusive dealer instead of handling various lines, "because exclusiveness makes for expertness," will control his prospects and assign them to salesmen best fitted to

### Ford Wiring Diagram Correction

Substitute this drawing for Fig. 1, page 18, Nov. 10, 1921, issue of MOTOR AGE. The generator charging circuit, as shown in Fig. 1, page 18, is incorrect in this respect: the wire from the ammeter through the junction block should be connected to the battery at the battery side of the starting switch. The incorrect photogram, Fig. 1, page 18, shows this wire connected to the starting motor at the starting switch terminal. This would cause the generator to charge into the starter instead of into the battery.





*The Greatness of Automotive Equipment Can Be Partly Realized at This Show*





## When Business Starts to Slack

# These Dealers Start to Take Up the Slack

### Capitalize Shop Records

"WE are going to make our service station sell accessories and our accessories sell service during the winter months and by that we expect to keep our business up to normal profits." That is the idea of the Trinity Tire and Service Co., of Dallas.

Manager Ray of the Trinity company said that during the dull months his service department will keep an exact record of every job done and from that record he will be in position to know when accessories are needed and personal solicitation will follow. From the accessory sales, he will keep tab on owners and solicit them personally and over the phone for service on cars and tires.

Ray said that he would increase his advertising in local papers, keep in close touch with old customers and through them work for new ones.

He will not only continue his service station days, but will open at night and will inaugurate a "pull in service" at any hour.

He said in addition to that, he and members of his force would be hitting the ball about ten hours a day for work and spending another two or three hours daily planning how to get more business the next day and the next week. He expects, by inaugurating the above moves and developing other ideas as they crop up, to be able to keep his income normal.

### Displays Winter Needs in Service Department

SERVICE facilities are going to be crowded to the limit next spring, due to the fact that there are more old cars than usual in daily use, and this condition will make possible a good service business during the winter months, is the opinion of W. H. Imes of the W. H. Imes Motor Co., Dodge dealer at Topeka.

The Imes Motor Co. plans to send letters to all Dodge owners in ten Kansas counties comprising its territory, notifying owners of the fact that the time for overhauling cars will be during the winter months when the owners will be less inconvenienced by the laying up of the car, and also that the service department will be in better shape to do the work then than later when the spring rush comes on.

This concern has also sent out form letters warning Dodge owners against the dangers of the first cold snap and drawing attention to the fact that its service department is fully stocked and equipped to install hood and radiator covers, non-freeze mixtures, and to change

the oil in crankcases to the oil best suited to winter use. A full display of winter accessories is shown in the service department where the owner who brings in his car for repair may inspect steering wheel hand warmers, car heaters, non-skid chains, foot warmers and all other accessories for winter use.

The letter also gives a regular price list of service charges which prevail under ordinary conditions, and a reduced price schedule for work to be done outside the rush season. This reduction, or "service bargain" will doubtless prove a good stimulant for late fall and winter business in the service department.

### Service Manager Is Best Car Salesman

OFFICIALS of the Hyland Motor Co., distributor of Marmon and Hupmobile cars, declare George D. Jorgensen, manager of the service department, is their best car salesman. "When owners, angered by some petty misbehavior of their machine, come to the service manager speaking only evil of the car, it is the service manager's task to placate them and set matters right, and to Jorgensen's credit, it may be said that his success along these lines has stamped him an asset to this organization many times over," said Russell Richards, general manager of the company, and president of the Intermountain Automotive Trades Assn.

According to Jorgensen, "the biggest way of getting and keeping business that lasts is to retain valuable employees. In order to keep these men on the payroll, they must not loaf. We keep a complete record of every owner's machine and when business is slack, the owner's list is inspected and business is solicited.

"Fairness and sincerity to the owner are the watchwords of the company. The owner must be educated to feel that when our service experts tell him his machine is in need of repairs that we mean every word of it. And that he must realize his machine is in grave danger of far greater damage unless the repairs are made.

"In this way our service department sells cars. We do not trust to luck that every machine we sell runs properly for the rest of a prolonged life. When a machine is in a shop getting repaired, we make notes of other faults and tell the owner. We are always on the alert for impending trouble, which we try to prevent.

"In our accessory department we have big show windows so arranged that the owner in our building seeking repairs

or advice cannot help but see the attractive display.

"One of our employees who has had two years' experience in the parts and accessory departments mingles with the owners when they bring their cars to the shop and points out the need of a spotlight or hand-warmers or the many other numerous things that he sincerely believes the man should have for his own good.

"He familiarizes himself with all the customers, calls them by name when they enter and in a persuasive but thoroughly gentlemanly tone, conducts his campaign to increase the sales of the accessory department.

"Our service department is not operated for profit. It is our selling talk, and we aim to provide a certain amount of free service. Our mechanics change their clothes oftener than is the rule, and are, as the result, cleaner. Our floors are exceptionally free of rubbish and grime, all of which facts go to impress upon the customer that he was not, using the common term, 'sold' when he buys one of our cars and elected to do business with us. He, in turn, becomes a selling argument for our cars, our method of doing business, and our organization in general."

### Seasonal Advertising

"THERE is plenty of business to be had in the accessory line during the winter months, if a dealer will devote some thought to methods of getting it," is the way the Becker Brothers of Topeka feel about winter business.

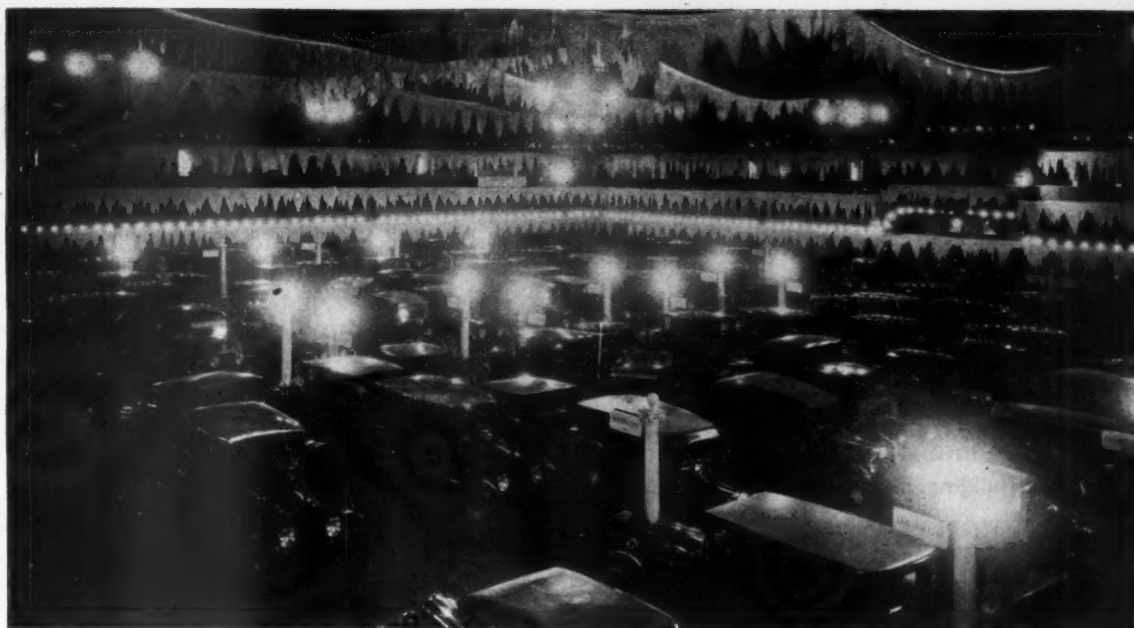
They have not allowed the mild weather to postpone their plans for getting winter business. They are now working on a window display which will show a man pouring anti-freeze solution into an automobile radiator. There will be an electric fan so arranged that it will keep a constant flurry of artificial snow blowing. In the foreground there will be a display of the solution, which is being poured into the radiator.

This concern has recently purchased a number of large roadside signs that will permit of the insertion of smaller announcements at one side. In this way goods of a seasonal nature can be very readily advertised.

The Beckers go on the theory of letting every customer know what they have to offer him other than the article he came in to buy. If a man comes in for a new spark plug, he is sold the plug, but before he goes out he has been given an opportunity to see the very latest thing in a safety signal at a low price, a hood or radiator cover, or any other new specialty which goes along with that particular season of the year.



The interior of the armory presented the picture of a huge grotto, the walls and ceilings of which were draped with giant icicles. The interior of the drill shed was hidden with dull blue hangings which formed a background for the sparkling icicles. The floor was divided into 38 spaces with artistic columns marking the divisions and carrying signs. In these the cars were well arranged



## New York Enclosed Car Show in a Setting of Icicles

EVIDENCES of the rapidly increasing popularity of the enclosed car and the resultant widening of the market for that product were numerous at the Enclosed Car Show of the New York Dealers' Association in the Twelfth Infantry Armory here this week.

Early in the week it was evident that the exhibit was attracting real prospects. The opening night was wet and disagreeable, but the show building was comfortably filled and the people who came were, almost unanimously, car owners who were serious in their desire to inspect and compare the products on the floor. As the show progressed, attendance was larger, but the high percentage of real prospective purchasers continued.

While the sales actually made on the floor were not phenomenal, they have

been consistent, and are accepted as a good indication of business that is bound to follow the close of the show. However, all of the exhibitors have made some sales. Most of these were closed in the salesrooms with prospects who had been entertained at the show, or who had been induced to visit the show by the sales forces of the exhibitors.

On the same floor, during the following week, Nov. 21-26, the New York dealers will exhibit used cars.

An interesting indication of the quality of the prospects attracted was revealed by a careful check of the show visitors made by the show management through the men who attended to the parking of visitors' cars around the armory. This check showed that 80 per cent of the attendance throughout the week was made

up of owners of open models, nearly all of whom, it was believed, were actual prospects for enclosed cars.

The show was well sold to the public for more than two weeks before the doors opened. All of the New York papers devoted considerable space in their news columns to the event and also carried effective paid advertising of the dealers' association, supported by a large volume of individual advertising in which the showing of enclosed models at the armory was mentioned by the individual dealers.

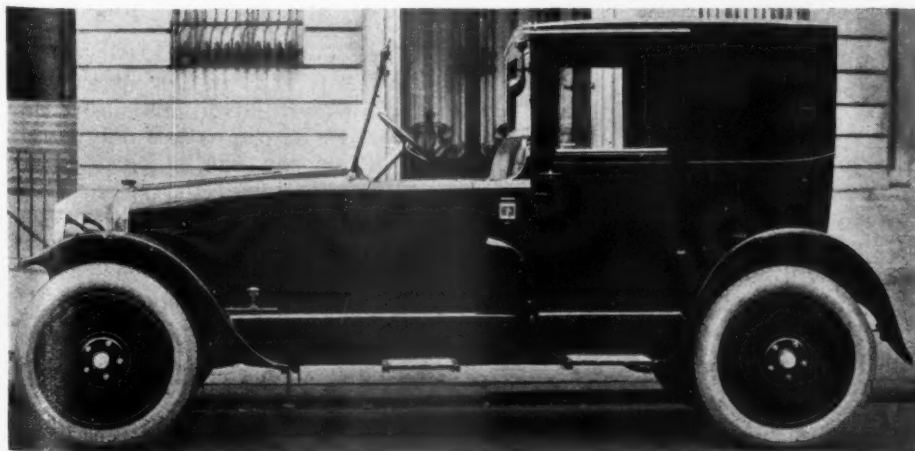
The fact that the show ran simultaneously with the New York Horse Show and during the opening week of the opera was responsible, to some extent, for the quality of the attendance.

A striking advertisement of the show was obtained through the erection of an illuminated arch on one of the grass covered islands in Broadway at the corner of Sixty-second street, where the Twelfth Infantry Armory is located. The arch, twenty feet high and about the same width, was clearly visible in the maelstrom of motor traffic in Columbus Circle, a stone's throw away. Under the arch was a large white arrow pointing west to the armory a block away.

Another effective show advertisement, in which dealers along the row cooperated, were the window posters, with large arrows, which directed pedestrians to the arch. The posters read: "Auto Show—Now—Follow the Arrow—Twelfth Infantry Armory, Sixty-second Street."

There were 175 cars on the floor, ranging from Fords to Rolls-Royce, and among them were several enclosed jobs which have been announced recently. These include the new Maxwell, the new Essex coach, Durant, Sheridan, Oldsmobile, Jordan, Mitchell and others.

Accessories occupied the balconies.



THE Dodge Brothers had a special town car job with lengthened wheelbase and a custom-built body by Babcock. A nickeled radiator, higher hood, disk wheels, drum type, nickel trimmed lamps, individual fenders, motometer, extra tire and cover, gave the model a distinctly individual appearance. The upholstery was gray plush and the interior was fitted with a flush encased phone and two extra seats which fold in flush with the back of the driver's seat. The job was priced at \$3700



# MOTOR AGE

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## A. E. A. Convention

ANY person who attended the Automotive Equipment Association convention and show last November and was present again last week could not help but be impressed by the fact that business is better. At every turn of events of the convention, whether in the show room, in the convention hall or in the informal gathering of tradesmen, both the spirit and action were better.

Last year dealers, jobbers and manufacturers who were present were interested in the exhibits and were interested in what was going on, but they were not pledging themselves to spend any money or to do any business. It was quite evident with most of them that they did not believe that business existed or would exist for many months to come.

This year there was considerable buying and a great many orders were placed. Many of these orders ran into large figures and form a pledge on the part of the jobber that he is either going to do a great deal of business in the next few months or that he will give his very best effort to this end.

When a man puts up his own money as a guarantee that he is going to endeavor to find business, you cannot ask for a better pledge. The jobber who bought freely from the exhibitors at the show is in a position to get more business than the man who bought spar-

ingly. There is no incentive to effort quite as strong as that of having your own money at stake.

It is cheering to think of the great number of jobbers who have bought freely at this convention and who are, consequently, going home fully determined that they will get their share of the business that awaits this branch of the industry.

Just how much of this business-getting spirit is due to the general feeling that business is better and how much of it is due to the special merchandising efforts of the association is hard to determine. Undoubtedly much of this spirit is due to the work that Mr. Sherman, the director of merchandising, has so well begun. His effort apparently appeals very strongly to the majority of the members of the association. Some of them already have profited by his efforts and others are just introducing his methods. Not the least benefit from this organized effort of sales promotion is the knowledge on the part of the members that a syndicate effort of merchandising effort is under way.

The show itself was interesting but, of course, was not a thing of beauty. It never was, and it never will be and it has no public appeal. It is purely a business show, organized for those who are within the industry. The fact that the space demands are increasing by leaps from year to year indicates that it has a definite place in the industry and will certainly grow in importance.

## Some Traffic Thoughts

IN Chicago the proper authorities are giving considerable thought to the necessity of eliminating some of the traffic on certain streets. One of the measures proposed is to remove the buses from State street and perhaps from other very busy streets. This thought is due to a realization that a street cannot support indefinitely increased traffic. Unnecessary traffic must be diverted, in order to make room for the necessary traffic of that particular street.

From all over the country come complaints that traffic conditions are proving to be a sharp sales resistance. Car owners are complaining that there is no satisfaction in driving their cars in most of the places where they want to go. They find that too many other car owners have decided to drive to that particular place on that particular day. As a consequence, they are a part of a procession, rather than enjoying the trip they had planned.

The remedy for this must come from the citizens chiefly interested in traffic. As we see it, these citizens are primarily those making their living from the automotive industry. This is so because this citizen is not only a car owner, but the support of his car, the support of his family and himself comes from the ability of persons who buy from him to use their vehicles. This man has a great deal more reason for studying traffic than has the man whose interest is merely that of an owner of a car wishing to use it for his convenience or the promotion of a business that could proceed more or less efficiently without the automobile.

There are many little things which would greatly improve traffic, such as proper enforcement of the traffic laws; the establishment of one way streets; the prohibition of vehicles turning around in the street; the elimination of unnecessary traffic, such as taxicabs scouting for fares, and other incidentals that any student of traffic may observe.

Traffic must be controlled by the responsible citizen taking a bold stand and maintaining it. The proper place for this movement to start is with the automotive



business association, and representatives of these associations should make careful study of the situation in the local field and then announce proposals for the cure of the evil and stand for them. It is only through organization that the reform can be brought about today. The representatives of these organizations, in addition to studying the traffic situation itself, must study the situation as to the making of ordinances and laws and work in conformity with the standard customs in this regard.



### A Benefit to the Industry

THE U. S. Department of Commerce is preparing to send an automotive specialist abroad on a 30 months' tour to look into the prospects for the sale of American automotive vehicles and equipment. William I. Irvine, who will make this tour, is especially trained in automotive selling and in export trade requirements. It is expected that his trip will prepare the way for a selling campaign for American automotive equipment throughout the world.

In the two months that the Automotive Division of the Department has been in existence, it has prepared the way for this work. A coordination in trade methods has been brought about among the members of the National Automobile Chamber of Commerce and trade information files have been established for the collection of foreign data.

It has long been a complaint of the automotive manufacturers that the information gathered as to foreign markets by the Department was not what was wanted, and it is because of this complaint that Special Representative Irvine has been selected to make this tour. He will meet the consular agents at the various points and assist them in gathering the much needed data.

This aid to the automotive market should be of value to every man in the industry. When a foreign trade of appreciable volume has been established, it will enable factories to make their working periods less seasonal and to reduce their costs by a greater production. It will not be necessary, under the conditions that will prevail, to work so closely upon domestic orders.



### Inspection a Mechanical Necessity

THE real meaning of inspection was not well defined and was much less known until the entry of this country into the World War. It was practiced more or less in some factories, but had not yet found its way into the shop, where the same carefully inspected products were operated and maintained.

The quality of the inspection rendered a service station through the chief inspector or testor, as he is sometimes known, determines the ultimate reputation of that service station.

Inspection is an absolute requisite to prevention of "comebacks," "hang-fire complaints" and unpleasing and unprofitable adjustments. The greatest disciples of thorough inspection are those men who saw service in the U. S. Air Service, for there inspection was developed to a high degree. The details of this inspection service would require considerable space to relate, but the lesson learned is that an airplane, if it is to maintain daily flights of long duration, demands several hours of daily inspection. These airplanes are inspected both before and after flight and the average time spent on each for this work is about three hours.

A recent case will show the necessity of thorough inspection as applied to automobiles, both at the factory

and at the service station. A new car was purchased; the owner drove this car two months and then the car developed battery trouble. Inspection of the battery disclosed that certain sleeves or washers which are used to protect the vent caps of the cells in shipment, were never removed. This prevented ventilation of the cells when gassing; the result was a badly deteriorated battery and the justified or unjustified complaint of an owner. It is difficult to lay the blame on any specific person but had the factory and the sales and service station a personnel with a well developed sense of mechanical inspection, this would have been well nigh impossible.

No organization can point to its mechanical staff as a well trained and careful lot of mechanics until they have each developed the powers of observation and concentration to a point where they can be classed as true inspectors.



### The Service Managers' Convention

THE semi-annual meeting of factory service managers, which was held in New York Tuesday and Wednesday of last week, from some standpoints was one of the most successful which have been held thus far. Yet, as is true of many conventions, there are some things which come to the minds of those whose privilege it is to sit in at a convention of this kind and which might be well incorporated in future meetings.

The meeting was a decided success from the fact that never before have the service managers so openly spoken about loose methods followed by their respective factories in trying to help the dealer's service end of the business. It was a success, too, from the fact that the men had a chance to listen to two such able speakers as Norval Hawkins of the General Motors Corporation and Percy E. Chamberlain, the latter long an exponent of the fixed price system of selling service.

There was literally a wealth of information coming out of the meeting. It is to be exceedingly regretted that every factory in the country did not see fit to send its service manager or representative to this convention. If the industry is to prosper as a whole, then every manufacturer must do his share towards the betterment of service work on motor vehicles.

It is not expected that the factory must necessarily work out in detail the dealer's service problem. That is altogether a local problem and can best be met by the intelligent and businesslike operation of the establishment by the dealer himself. But the factory can be of vast use in so shaping its product that maintenance of it by the dealer will be a comparatively easy job. That is why an exchange of ideas at a meeting like the one just held is of value and why every maker should get into the spirit of it, at least.

The suggestion is offered here that at future meetings those in charge invite perhaps three or four automobile dealers, one from a large city, one from a small city and perhaps one who operates in a farming community. Also, let there be present some representatives of parts makers, clutch, gearset, bearings, etc. Then when questions come up regarding dealer conditions, or the parts price situation, these representatives can present their side of the case, and instead of floundering around and not arriving at some definite conclusion, things can be settled then and there.

As long as factory service managers have to cope with conditions which affect the dealer's service with parts makers and others, why not get men from all of these divisions of the industry together at some future meeting and make it a double-barreled affair?



# Sales' Slump More Imaginary Than Real

## Year's Output Bids Fair to Approximate 1920 Mark

### Third Quarter Production Falls Short Less Than 55,000 Ve- hicles of Last Year

NEW YORK, Nov. 22—Official production figures showing a total output of 511,510 passenger cars and trucks for the third quarter of 1921 prove conclusively that the "slump" in the automotive industry has been more imaginary than real. This figure is only approximately 55,000 less than the production for the same period of last year which included two of the best months of 1920.

In July, August and September of this year there was a truck production of 37,332. This probably was about 7,000 less than the output of commercial vehicles for the third quarter of 1920. While by far the greater portion of the trucks sold this year were light delivery vehicles, a comparison of the total is impressive and demonstrates that a considerable number of trucks is going into service constantly.

It is perfectly safe to say that no commercial vehicles have been made for which there has not been an immediate

(Continued on page 32)

## Dealers Get Time Extension For Filing Amended Returns

Washington, Nov. 19—Extension of the time for filing amended returns in cases in which appreciated or inflated values have been used in determining invested capital will undoubtedly prove a boon to automobile manufacturers and dealers. Secretary of the Treasury Mellon has extended the time for filing amended returns and making payments of additional taxes due Jan. 15, 1922.

Under the provisions of treasury decision 3240 provided and promulgated Aug. 25, taxpayers who had included appreciations in their income and profits taxes for 1917 and subsequent years were required to file amended returns within 90 days and pay the additional taxes. There were many appeals from the automobile industry to the effect that it would be impossible to make payments at this time. In some cases the additional amount due the government exceeded \$100,000 and it was manifestly impossible to raise this cash by Nov. 24.

### DURANT STARTS DEC. 20

Lansing, Nov. 19—Quantity production will be started at the Lansing plant of the Durant Motor Co. of Michigan on Dec. 20. It is proposed to turn out 4000 cars by March 1.

### JERSEY CITY SHOW LEADS SEASON

Jersey City, Nov. 22—The second annual automobile show of the Hudson

County Automotive Trade Assn., which closed Nov. 19, marked the opening of the 1921-1922 show season. If the reception accorded it and the results obtained can be taken as any criterion, dealers in other cities may well look forward to their own shows with a great deal of optimism.

In all, there were 35 makes of cars on exhibition. There were 102 vehicles on the floor, including 52 enclosed models, 40 open jobs, 6 chassis and 4 trucks. Prices ranged from \$525 to \$9300.

## Delaware Lays Ground Work to Build State Association

Wilmington, Del., Nov. 21—If plans laid at the last meeting of the Wilmington Automobile Trade Assn. work out as anticipated, the association will become a statewide organization, having the entire state of Delaware for its field.

H. C. Partington has been appointed chairman of a membership committee, whose special duty will be to canvass the 100 or more dealers in the state outside of Wilmington and learn their attitude toward the proposition. Industrial benefits are anticipated all around from such an arrangement.

At the same meeting at which this matter was brought up, ground work was laid for the 1922 motor show here. President Harry Loose was directed to appoint a committee to formulate plans for the show.

### BATTERY MEN TO MEET

Detroit, Nov. 21—Storage battery men in the Detroit metropolitan district will hold an organization meeting on Dec. 8 for the purpose of forming a battery section of the Michigan Automotive Trade Assn. A dinner will be tendered the battery men by the big distributors, who are fostering the formation of the section to curb abuses which have beset the battery business.

### CITY OF SPOKANE BUYS BUSES

Lansing, Nov. 21—The Olds Motor Works has received an order from the city of Spokane for 16 Oldsmobile truck chassis. The trucks will be shipped at once and will be used by the city as the nucleus of a municipal bus service to facilitate the handling of passenger traffic within the city.

### PAIGE DEALERS' NEW CAR

Detroit, Nov. 19—Announcement is made by the Paige-Detroit Motor Car Co. that the Paige dealers will be able to offer a car in the light car field early in 1922. It is stated that plans are so far advanced that the new car can be shown at the New York and Chicago shows, although no information has been made as to specifications or price.

## Calls for Enclosed Cars Gain Rapidly in Wisconsin

### Milwaukee Dealers Estimate That 40 Per Cent of Cars Sold Are of This Type

MILWAUKEE, Wis., Nov. 21—A sustaining influence is reported by members of the Milwaukee Automotive Dealers' Assn. as an after-effect of the Enclosed Car Week observance during the second week in November. The campaign likewise has led dealers to get together some figures which show that the call for enclosed cars has increased so steadily in the last four to five years that it may be conservatively estimated that about 40 per cent of the cars sold now are of the enclosed type. The ratio is probably higher than in other sections of the United States because of the climatic conditions in Milwaukee and Wisconsin.

Alfred Reeke, head of the Reeke-Nash Co. and the Reeke-Lafayette Co., said that sales are now running about 65 per cent on open cars and 35 per cent on enclosed. If permanent tops such as the California type are included in the enclosed car classification, the percentage will run about 37 or 40 per cent. Reeke predicted that within two years the average dealer will be selling cars on the

(Continued on page 32)

## Hanson New 6-Cylinder Car Planned to Sell Under \$1000

Detroit, Nov. 19—Plans, it is said, are well under way by the Hanson Motor Car Co., Atlanta, to manufacture in Detroit a new six-cylinder car to sell under \$1000. George W. Hanson, president of the Hanson company, is planning to organize a new company with a capital of from \$25,000,000 to \$50,000,000, in which will be contained several parts-making concerns. Models of the new car are promised in time for the national shows, and production is planned for early in 1922. It is the plan of the new company to continue the present Hanson line.

### A. A. A. CLUBS MEET

Chicago, Nov. 18—Invitations were sent to the executive officers of every automobile club in the United States affiliated with the A. A. A., urging that the club officials attend the two-day convention held in Detroit at the Tuller Hotel, Nov. 21 and 22.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce; E. E. Peake, president of the National Association of Show Managers and Secretaries, and Jesse A. Smith, president of the National Automobile Dealers' Association, were among the speakers.



# Dealers to Control Distribution

## Seiberling Incorporates in Delaware for \$55,000,000

### Plans to Market Tire of New Design; Holdings Include Two Factories at Present

AKRON, O., Nov. 21.—F. A. Seiberling, formerly president of the Goodyear Tire & Rubber Co., has announced the details of the Seiberling Rubber Co., which has been incorporated under the laws of Delaware with a capital of \$55,000,000. Seiberling said that it was the purpose of the company to sell 50,000 shares of preferred stock at \$100 and 500,000 shares of common of no par value at \$10 a share. The officers as announced here are: Frank Seiberling, president; Charles W. Seiberling, vice-president; W. A. M. Vaughn, treasurer, and E. A. Palmer, secretary. All officers are former Goodyear officials. I. R. Bailey, formerly of the Goodyear sales department, has been announced as sales manager.

Seiberling plans to place upon the market a new tire of an entirely new design. At the present time he is operating the Lehigh Rubber Co., of New Castle, Pa., which he purchased at a receiver's sale, and was the successful bidder for the Portage Rubber Co., of Barberton, which has been in receivership for eight months, and which was recently ordered sold to him. He will also probably control the Star Rubber Co., of Akron, which is now being reorganized and several other smaller companies in Ohio which have not been definitely announced.

Production will be started, if he obtains the Portage plant, with 5,000 tires and 6,000 tubes a day, Seiberling announced.

Seiberling was also a bidder for the Republic Rubber Co., of Youngstown, which is in receivership, and although he has announced that he was no longer interested, it is still reported that he may obtain this plant.

## Underwriters Cut Coverage and Insurance Rates 20%

NEW YORK, Nov. 19.—The Western Automobile Underwriters' Conference voted to put into effect on Nov. 15 a limited coverage indorsement and a theft limitation indorsement for Cleveland and Cuyahoga county, O. These indorsements are made mandatory, one or the other, but not both, and the rates are reduced 20 per cent for such limitation. These indorsements provide that the company shall not be liable for an amount greater than 80 per cent of any loss or damage sustained.

The western conference also has adopted a form of limited theft coverage

to be applied in Chicago and Cook county, Ill. This is to be effective at once, and is in the form of an indorsement limiting the percentage of liability for loss from 75 to 95 per cent, according to list prices of cars insured. For the use of the limited coverage a credit of 50 per cent of the theft rate is to be allowed on classes of cars where the 75 to 85 per cent limit is to be used, and where the 95 per cent limit of liability is used a credit of 40 per cent in the rate is allowed.

## Fifteen Entered for Race at Los Angeles Thanksgiving

LOS ANGELES, Nov. 21.—Entries in the Thanksgiving Day race on Beverly Hills Speedway include R. DePalma, Milton, Hearne, Sarles, Murphy, Thomas, Hartz, Hill, Elliott, Fretwell, Klein, Snoddy, Miller, Wonderlich and J. DePalma.

The event will be 250 miles for a purse including lap prizes of \$35,000. This will be the final race on the coast this season and a championship event of the year. Additional entries are expected. Duesenberg built cars predominate among the mounts.

## APPLETON DEALERS ORGANIZE

APPLETON, Wis., Nov. 21.—Dealers, garagemen, repairshop owners and automotive equipment shops in Appleton, Wis., have formed a local organization under the name of Appleton Automotive and Service Dealers' Assn., to establish a better feeling of fellowship among themselves and to conduct repair business on a strictly cash basis. August Brandt was elected president; Edward Schneider, vice-president, and Leo Milhaupt, secretary and treasurer. Monthly meetings will be held.

## TO PROSECUTE GEORGIA DEALERS

ATLANTA, Ga., Nov. 22.—Since Aug. 1 the special license privilege granted dealers has been abolished, except on cars or trucks used for demonstration purposes, and officials of the state motor vehicle department declare that many dealers throughout the state are violating this law. The campaign now in progress will cover every city, town and rural community, and those dealers found who are still taking advantage of the now defunct temporary license privilege are to be prosecuted.

## CONCORDIA DISCONTINUES

MILWAUKEE, Wis., Nov. 21.—The action of the Concordia Fire Insurance Co. of Milwaukee in discontinuing its automobile department, has resulted in considerable agitation of conditions affecting all forms of insurance protection of motor vehicles. The only explanation of the Concordia's action is that "the unsatisfactory condition of the automobile business is responsible for the move."

## Elimination of Distributor Rapidly Gaining Momentum

### With Dealers' Control of Distribution Better Discounts, Service, Good Will Are Argued

BY JAMES DALTON,

News Editor, *Class Journal Co.*

NEW YORK, Nov. 21.—While little has been said officially about the movement, which is rapidly gaining momentum among automobile manufacturers, concerning the eliminating of distributors, there is a strong general trend in this direction. Several of the larger companies propose to begin this process of elimination when their contracts with distributors expire.

The Willys-Overland Co. was the first to put the sweeping change into effect by supplanting distributors with factory branches. The various divisions of the General Motors Corp. are reticent on the subject, but there is reason to believe that it will be the policy of the corporation, as a whole, gradually to supplant its distributors. These are only examples to show the trend, and numerous other companies propose similar action.

It is contended that with the distributors, or middlemen, out of the field, it will be possible to make a more liberal discount to the dealer, keep in closer contact with the individual dealers and promote more intensive selling efforts. Manufacturers realize that competition in future will be keener than it ever has been in the past and they are clearing the decks for action.

They contend that they must progress in the race for business or fall back, for they cannot stand still. All of them are determined to give better service, for they hold that those companies which take best care of their customers will profit most in the long run. Willys-Overland has taken a step in this direction by making a material increase in the discount given its dealers on parts.

In several lines, at least, final price adjustments have not been made and there will be further reductions coincident with the New York and Chicago shows. There is a strong hope in every quarter of the industry that the shows will bring a real stabilization of prices. Dealers in all sections of the country contend that the frequent price changes of recent months have added of late to sales resistance and that business cannot be placed on a solid foundation until there is price stabilization for a considerable period. This feeling is not particularly surprising, in view of the fact that several companies have reduced their prices after giving positive assurance that the "final reductions" had been made.

Passenger car manufacturers have no

(Continued on page 32)



## Lincoln Sales Will Start Upon Finish of Inventories

**Policies of Company to Be Continued—Production to Proceed Upon Order Basis**

DETROIT, Nov. 21—Inventories are still in progress at the plant of the Lincoln Motor Co. and probably will not be finished for a few days. Until this task is completed, no more cars will be built and no operating schedules will be determined upon. Sales demand will be met from the reserve of cars on hand when the receiver took charge.

H. L. Stanton, vice-president of the Detroit Trust Co., has taken over the active executive work of directing the company. He is being assisted by President H. M. Leland and W. C. Leland, vice-president, acting in advisory capacities. Stanton is the corporation officer of the trust company and has acted as receiver in several reorganizations of automotive companies. He thinks it unlikely that the services of an automobile executive will be sought.

The receiver has not determined how much money will be available to continue the business, but President Ralph Stone of the Detroit Trust Co. thinks it likely there will be enough without the issuance of receiver's certificates. In this connection he declares that the creditors are cooperating to the fullest extent in helping replace Lincoln on a sound business footing.

Completion of cars now in process will give the company an additional margin to work upon and a fair number of sales are expected in November. Orders are reported coming in steadily, distributors finding the demand well up to seasonal standards and in some districts exceeding it.

The receiver states that sales policies of the Lincoln company will be continued, at least for the present. This will mean operating on a sales basis with the possibility of a sales campaign being launched later. A telegram was sent to all distributors today by the receiver, promising active cooperation at the earliest possible moment and declaring the company was prepared to fill all orders for cars as well as to meet all service demands.

A definite statement of assets and liabilities is now being prepared. Until it is available, definite plans cannot be announced for the operation of the plant. Only minor changes have been made in the organization. The office force is being reduced, but otherwise the company is staffed to resume operations. Creditors are being asked to forward statements of their accounts for comparison with the company's records.

Through an error, it was stated in MOTOR AGE last week that the Lincoln company had filed a voluntary petition in bankruptcy. The court action involved only the appointment of a receiver

upon petition of a creditor asking for a receivership for the protection of assets and continuance of the business pending reorganization.

No announcement has been made concerning reorganization plans, but it is understood the Lelands lost control of the company when mortgage bonds were issued last July.

## "Pound" for Motor Cars, Mayor's Plan

PHILADELPHIA, Nov. 19—An automobile "pound" in which to segregate cars whose owners have violated the parking regulations for the center of the city is projected by Mayor Moore of Philadelphia.

After making the rounds of the city today, the mayor declared that he would immediately order the building of such a place of detention, and have it built at a considerable distance from the city hall, the object being to make it troublesome for owners of stray cars, who violated the regulations, to get them "out of pound" by identifying and claiming them. Violations of the parking rules have become a nuisance and shopkeepers are complaining of the habit.

## NASH DEALERS IN CONVENTION

Boston, Nov. 19—Charles B. Voorhis, vice president and general manager of sales for the Nash Motor Co., was the chief speaker at the convention here Nov. 11, of the New England Nash dealers working under the C. P. Rockwell, Inc., firm, distributor for the territory. Following an all-day session, at which the new models of the four and six Nash cars were shown for the first time, the 125 dealers attended a dinner at the Copley Plaza hotel. Rockwell, who presided, told the dealers that last week he sold more cars than for the entire month of October in 1920, and the past two weeks were the best he had in 1921, as evidence that business is coming back.

## SELLS FOURTH TRAINLOAD

Boston, Nov. 19—"Trainload" J. M. Linscott, New England Reo distributor, is on the job again. A fourth trainload of cars and trucks landed here this week, making the fourth in three months, or a total of 720 vehicles that he has sold in that time.

## Spirit of Good Samaritan To Increase Gasoline Flow

**Oil Companies Spread Patents for Cracking Process in Refining Throughout Industry**

CHICAGO, Nov. 19—Production of gasoline may be considerably increased by a business arrangement which has been entered into between two of the largest factors in the American oil industry. The Standard Oil Co. of Indiana and the Texas Co. have accepted a plan under which each has the right to operate under patents held by the other. These patents pertain to the pressure cracking of crude oil in relation to the manufacture of gasoline and other petroleum products. Furthermore, and of greater importance, either company may license others to operate under any and all of the patents under an agreed division of royalties.

The granting of licenses to other companies to use these patented processes, through which the greatest percentage of gasoline is produced from crude oil, should result in benefiting the oil industry as a whole and also increase the supply of petroleum products essential for the use of internal combustion engines. Larger production of gasoline should prove a stimulus to the automobile industry.

The Standard Oil Co. of Indiana owns Burton, Humphreys, Clark and other patent rights, while the Texas Co. holds the rights on the Adams, Holmes, Manley and other patents. Through the Burton process, which was largely developed by Dr. William Burton, new president of the Standard Oil Co. of Indiana, nearly 50 per cent in gasoline is obtained from crude oil, whereas in 1910 the average was about 11 per cent and in 1920 about 26 per cent. The Standard Oil Co. of Indiana is one of the principal refiners and the Texas Co., one of the largest producers of crude oil, as well as a large refiner.

## ELIMINATES MILEAGE GUARANTEE

Chicago, Nov. 21—The Mid-West Rubber Assn., following the lead of the Rubber Association of America, at its last monthly meeting in Chicago, decided to eliminate the tire mileage guarantee and to make all adjustments hereafter on the basis of defects in workmanship and material.

## LOOK OUT!

**S**WINDLERS are again at work soliciting subscriptions to MOTOR AGE.

Receipt cards bearing the name of The Standard Sales Co., St. Louis, Mo., which we learn does not exist, are being used by these bogus solicitors.

The signature, James L. Sterling, appears on a number of cards sent to MOTOR AGE by dealers who have been victimized.

Bear in mind that MOTOR AGE does not employ any traveling subscription representatives nor give out to anyone the expiration dates of subscriptions.

If you are solicited by strangers, try to hold them under some pretext and notify the police and telegraph MOTOR AGE immediately.



## Cunliffe Leaves Cadillac to Direct Peerless Sales

### Broad Extension Planned Under New Management of Big Cleve- land Concern; Double Production

CLEVELAND, Nov. 19—The appointment of C. R. Cunliffe of Chicago, as general salesmanager of the Peerless Motor Co. was announced here today by R. H. Collins, president and general manager of the corporation. Cunliffe succeeds Robert J. Schmunk, who has for years been the Peerless general sales manager. Schmunk submitted his resignation and it was accepted shortly after Collins took over the control of the management of the Peerless.

It was stated unofficially that Peerless would be brought into greater prominence in the trade than it has enjoyed in the past. It also was rumored that production would be doubled within a comparatively short time if plans formulated were executed. The appointment of Cunliffe is regarded in the industry here as the first step in a well defined movement to give Peerless a higher geared and more effective sales and distribution organization. Collins, it is known, has formulated a program that for development is of the first magnitude. For weeks since the sale of Peerless to Collins his engineers have been making an intensive study of conditions in the Peerless organization. In selecting Cunliffe there was brought to Peerless what was regarded as a star in the Cadillac distributing force. Cunliffe was with the Collins organization when the latter was president of Cadillac. The new general sales manager of Peerless resigned as general manager of the Cadillac branch in Chicago to come to Cleveland. Before going to Chicago, he was manager of the Cadillac business for the Philadelphia district. In both cities he was particularly successful, his work in Chicago being especially fine.

### COUNTY ASSOCIATION ACTIVE

Cambridge, Ill., Nov. 19—The Henry County, Ill., Automotive Trades Assn. has been proving a successful and progressive body. Regular meetings are held with an average attendance of 40. At the last meeting, held in Cambridge, R. R. Fisher, representing the Davenport Auto School, was present and delivered an interesting address in which he quoted some statistics relating to the development of the industry. Edward O'Donnell of the Chicago Automotive Equipment Assn. spoke of the situation in the metropolis and how various problems affecting the industry were handled there.

### NASHVILLE SHOW IN MARCH

Nashville, Tenn., Nov. 19—The Nashville Automobile Trades Assn. has set the date for the Eleventh Annual Automobile show for March 6 to 11, 1922. The

following committee has been appointed to have complete charge of all arrangements for the show: Allen Parkes, chairman; Jas. B. Frazier, F. B. Fisher, Chas. H. Simpson, Jas. Austin, Ray Royer and R. B. Brannon.

Plans are being prepared to secure the cooperation of the Nashville retail merchants to hold their fashion show at the same time and also the Wholesale & Jobbers' Assn. to hold their spring buyers' week on the same dates as the automobile show.

## Distributor Contract Holds in Suit Against Hassler

Columbia, S. C., Nov. 19—David C. Shaw of this city has been awarded damages against Robert H. Hassler, Inc., of Indianapolis, Ind., in the sum of \$15,000 by the jury which heard the suit in the United States District court here. The action was for damages in the sum of \$175,000.

The suit for damages grew out of an alleged breach of contract regarding the state agency for automobile shock absorbers, manufactured by the Hassler company. The agency for South Carolina, the plaintiff testified, was given him by the Hassler concern, which contracted with him, he said, to give him exclusive distributing rights in this state for a period of not less than five years. Under this contract Shaw testified, he accepted and sold one carload of the shock absorbers, building up at the same time a sales force throughout the state. A second car of shock absorbers arrived, Shaw said, and he was notified that he was no longer state agent and the Columbia Compress Co. instructed not to deliver the car to Shaw, refused to turn it over to him. The Hassler company claimed the right to terminate the contract and also set up the plea that Shaw, by his alleged failure to pay for the car, had in effect cancelled the contract.

This is the second time that the case has been tried, the first hearing of the case having resulted in a mistrial.

### HINKLEY REORGANIZES

Detroit, Nov. 19—Incorporation papers have been filed by Hinkley Motors Inc., taking over all the assets of the Hinkley Motors Corp. which were sold by the trustee on Nov. 2. The new corporation has taken a long lease on the recently completed Hinkley plant in Ecorse and will begin production of Hinkley engines immediately. The board of directors is composed of C. C. Hinkley, president; Leon Alvarez, vice president and secretary; Henry M. Butzel, treasurer, Fred J. Fisher, Charles T. Fisher, Louis Mendelsohn and Aaron Mendelsohn.

### MONTREAL SHOW CANCELLED

Toronto, Nov. 19—"The Montreal Automobile Trade Assn. has decided that there will be no motor show in Montreal during the coming winter," says T. C. Kirby. Consequently, there will be no motor show in Eastern Canada during the coming season of 1922.

## Dealer Courage Responsible for London Show Success

### High Prices and Tight Money Serious Handicaps to Industry in England

LONDON, Nov. 22—(By Cable to MOTOR AGE.)—Business optimism was maintained throughout the annual London passenger car show, which closed Nov. 12 at Olympia and the White City. There were substantial sales of lighter cars and some of the heavier makes. Reports of large car business are too varied for analysis at this time.

There is a feeling on the part of the public that prices must drop and high body prices are a trade barrier at present. The success of the show was due preeminently to the courage of the dealers. Private sales have been fair and there has been a much larger volume of inquiries than in recent months.

The somewhat improved financial situation and prospects of trade betterment have been the chief factors in this result. Money is tight everywhere and therefore it is the part of wisdom to exercise caution in accepting as facts reports now in circulation regarding the actual volume of trade at the show. A majority of the exhibitors professed to be satisfied with the business promised rather than the actual sales. The attendance has been 40 per cent better than last year, notwithstanding the fact that the weather was cold throughout the week.

The location of the next show is being discussed. It is generally accepted that the present plan of dividing the show between two buildings cannot be continued because it has led to much dissatisfaction on the part of the trade.

### MUST FILE ALLEN CLAIMS

Columbus, O., Nov. 23—Notices have been issued by George A. Archer and William C. Willard, receivers for the Allen Motor Co., that all creditors having claims against the company or its receivers, or agents or either must file them with the receiver by Dec. 8, making proof under oath to the claim. This action is taken by order of the court preparatory to offering the plant and other assets of the company for sale at auction.

### MAIBOHM SALE NOV. 28

Sandusky, O., Nov. 19—The sale of the Maibohm Motors Co., for the purpose of reorganization has been postponed until Nov. 28 in order to determine priority of a claim for Federal taxes and allow other creditors to align themselves in the matter of the reorganization.

### KEYSTONE TIRES REDUCED

New York, Nov. 19—Reductions which bring prices of its product identical with those of the Goodyear Tire & Rubber Co. have been made by the Keystone Tire & Rubber Co., effective immediately.



## Dealers Continue Victims of Dog-in-Manger Politics

### Pending Law Offers Protection to Dealers on Vehicles Only Partially Paid For

WASHINGTON, D. C., Nov. 19—Fill-busters against the Willis-Campbell anti-beer bill in the senate have delayed the enactment of the so-called Dial bill in the house. The Dial bill is of particular interest to automobile owners, as it provides for the protection of their equity in motor vehicles in the event of seizure for illegal transportation of alcoholic beverages. The Dial bill, which originated in the senate, was passed by that body several months ago. It provided that an innocent party to a seizure for bootlegging should not lose whatever equity is involved in the car. The enormous increases in arrests of bootleggers transporting liquor in automobiles to which they did not have a clear title provoked widespread uneasiness in the trade.

It appears that the chief stumbling block to this legislation is Chairman Volstead of the house judiciary committee. Volstead is the sponsor for the eighteenth amendment and a zealous "dry" legislator. It is known that he has deliberately delayed this bill in committee because the senate refused to accept the search and seizure provisions of the Willis-Campbell bill. The passage of the latter will undoubtedly assure early enactment of the Dial bill.

## Calls for Enclosed Cars Gain Rapidly in Wisconsin

(Continued from page 28)

basis of 60 per cent open and 40 per cent enclosed, all the year round.

Jesse A. Smith, Hudson and Essex distributor, said: "The demand for Hudson and Essex is about 50 per cent of our open car business in the city of Milwaukee, and 25 per cent in the country districts. In our opinion it is the desire of practically everyone living in this climate to own an enclosed car. Enclosed car prices, in comparison with those on open cars, have kept many from buying them. It is very evident that with the price right, there is going to be tremendous demand for enclosed cars from now on."

W. H. Krueger, Cole, said, enclosed cars are now selling about 75 per cent of open cars. This is an increase of 25 per cent within the last year.

A. B. Pease, manager of the Milwaukee assembling plant of Ford, said: "Our output of coupes has reached the proportion of 25 per cent of our total output. Our sedans run about 20 per cent. In other words, virtually 40 per cent of our Ford output in Wisconsin is enclosed cars. When the Ford enclosed car first came out in 1915, we handled less than one per cent of these models, showing that the growth has been tremendous. Factory figures on enclosed car production are 25 per cent of the total output,

but Wisconsin runs higher than the average because of our climate."

William F. Sims Motor Co., Lincoln, said the distribution of enclosed models to open models will soon be at least 75 per cent in favor of enclosed types. Even the small communities in Wisconsin are developing a good inquiry for coupe, sedan and limousine models.

The Achen Motor Co., Chandler and Cleveland, said: "The enclosed car business in our lines covers approximately 20 per cent of our total sales and the demand is increasing rapidly. We feel that this percentage will be changed greatly within a short time."

Wisconsin Oakland Co., distributor of the Oakland: "In 1919 our percentage of sales ran approximately 10 per cent enclosed and 90 per cent open cars. In 1920 the percentage increased to 25 per cent enclosed and 75 per cent open. In 1921 our sales of enclosed cars has been about one-third of the total. It is our candid belief that in the near future enclosed cars will be sold in equal numbers to open models."

## Year's Output Bids Fair to Approximate 1920 Mark

(Continued from page 28)

market. The same is true, to a very large extent, of passenger cars. It is highly probable, however, that in the coming year the production of trucks will increase, proportionately, much more rapidly than that of motor cars.

While there are indications that there will be a considerable shrinkage in the number of individual manufacturers, the highway transportation industry is merely in its infancy and the next few years will witness a development which will parallel that of the passenger car. It will keep pace, in general, with improvement in general business conditions. Vocational selling will be intensified and it already is making rapid progress in many lines of industry.

The volume of sales has fallen off considerably since October in most sections of the country, although there are a few districts in which there has been little change. It is probable, however, that there will be a gradual decline until after the turn of the year.

The interest of the industry and of prospective purchasers is centered more closely than in years on the approaching New York and Chicago shows. As a consequence there is a disposition on the part of the public to delay purchases, except of inclosed models, until after that time.

An extraordinarily large number of new models will be displayed at the shows this year and some unusually interesting announcements are being withheld until that time by manufacturers.

## AUTO BODY DOUBLES FORCE

Lansing, Nov. 19—The Auto Body Co. has doubled its working force and will gradually increase the number throughout the winter as the new models of Durant and Earl cars get into production.

## Oakland Line of Cars Will Be Continued Through 1922

### GMC Statement Puts End to Rumors of Discontinuance; Improvements to Be Made

NEW YORK, Nov. 25—A statement asserting that the present Oakland line, "with gradual improvements," will be continued for the 1922 selling season has been issued by P. S. duPont, president of General Motors Corp. His statement follows:

"It is but natural that there should have been constant gossip during the past few weeks while automobile price revisions were under way. The policies of General Motors Corp. with respect to certain of its manufacturing divisions were not immune, the future of Oakland being the subject of persistent rumors.

"This division is in a healthy condition, with its business stabilized and sales increasing. The present line of passenger cars, with gradual improvements, will be continued for the 1922 selling season. Thereafter, new models as may be required by the trade may be introduced."

## Elimination of Distributor Rapidly Gaining Momentum

(Continued from page 29)

illusions about the difficult position of the dealers. They do not expect bankers to look with favor upon the stocking of automobiles very far beyond immediate requirements. Many dealers are going out of business and some distributors who have not shown a profit for the past year expect to discontinue their lines. As a consequence, there probably will be reduced selling representation during the next year, not only in numbers but in quality, and this is one of the problems which the industry is facing. The result will be competition for the dealers who remain in the field and the education of new men.

These conditions probably will bring about an attitude of greater independence on the part of dealers who remain in business, because they realize that they will have little difficulty in obtaining satisfactory lines. Most of them hope that manufacturers will curtail production for the next few months, so that there will be a temporary shortage in the spring. They believe that this would do much to clean up the surplus of used cars now on the market. They blame over-production by manufacturers for much of the trouble from used cars. Much of their money is tied up in used cars and this automatically cuts down the amount available to stock new cars.

## HEATERS IN COLE CARS

Cleveland, Nov. 19—The Cole Motor Car Co., through its advertising agency, announces that models with all-weather tops are equipped with Perfection heaters. This is in addition to the enclosed cars, which have this equipment.



## IN THE RETAIL FIELD

Oakland Motor Car Co., Philadelphia, has secured larger and improved quarters, moving from 918 to 911-13 North Broad street. The service station is located at Thirty-first street, below Dauphin.

Willis-Overland, Inc., Philadelphia, has opened a second retail store at 250 North Broad street. The first store opened a week ago. The Broad street retail store will be managed by H. Summerscale, as assistant to George B. Albrecht, in charge of all retail stores of the concern in the Philadelphia division. H. B. Westal is manager of the Germantown retail store.

Paul C. Booth, Hartford, Conn., distributor of the Grant Six, has moved to larger quarters.

Harry J. Foster and T. B. Schmidt, Hartford, Conn., have organized the Battery Service Co. of Hartford, taking on the agency for the Westinghouse storage battery. Foster was formerly in the sales department of the Hartford Good-year branch and Schmidt was formerly identified with the accessory department of L. L. Ensworth & Sons.

John W. Norton will erect a building at University and Lexington avenues, St. Paul, to house the northwestern distributing agency for Case cars, formerly handled by the Ashley Motor Car Co. in Minneapolis, which has substituted for the Case the Minnesota agency for the Franklin car.

Barley Motor Car Co., maker of the "Roamer," has recently perfected several agency connections. Sales and distributing offices have been located in St. Louis, Mo.; Oakland, Calif.; Alliance, O.; Rochester, Syracuse, Niagara Falls, N. Y., and Charlotte, N. C. The last named is a state distributor for all North Carolina.

Frank H. Hutchinson, Jr., general manager of the Iron City Motors Co., Chicago, announces that his firm has been awarded the contract for the new Coats steam car in Chicago territory.

O. G. Roberts Co., of Columbus, O., central Ohio distributor for the Nash, has been changed to the Nash Co., and the salesrooms and service station have been moved to larger quarters. The distribution of the Peerless has been given up and the company will concentrate on the Nash.

Morton-Payne Motor Sales Co., Columbus, O., is now settled in its new salesrooms. The company deals in used cars exclusively.

Columbus-Lafayette Co., Columbus, O., has been formed for the distribution of Lafayette cars in central Ohio. Raymond M. Cheseldine is at the head of the company.

Auburn Sales Co. has opened its new automobile salesrooms in Cleveland. More than 18,000 sq. ft. are occupied by the salesroom and the service department. P. R. Warden is president of the company; S. F. Selby, vice president; R. A. Gramling, treasurer, and Leonard Glueck, secretary.

Willis-Overland distribution in 24 counties in Iowa and Illinois will be directed from Davenport, Ia., at an early date. H. L. Lytle of Burlington, wholesale distributor, has announced removal from Burlington.

Owen Manufacturing Co., Davenport, Ia., has been incorporated here with \$30,000 capital to engage in manufacture, purchase, exchange, storage and repair of motor vehicles and accessories. W. H. Seaman is president, and Paul Ehlers, vice president and secretary.

M. N. Bonner, Pacolet, S. C., plans the erection of a new garage. He will carry a full line of accessories.

Davis motor cars have been taken over by a new firm in Charlotte, N. C., the Davis Motor Car Co., headed by C. E. Harris, formerly with the Mull Motor Co., and C. A. Burgess, of Atlanta.

MacMillan & Marshburn, Wilmington, N. C., has been appointed agent for the Dodge car in the Wilmington territory.

M. S. Anderson, Inc., Tacoma, Wash., has been organized by M. S. Anderson, W. T. Burwell and R. E. Sargent, to buy and sell automobiles.

Harold F. Berg, Galesburg, Ill., has opened a new battery and electric car service station. He has installed a first class outfit and comes to Galesburg after 10 years' experience in a similar capacity in Chicago.

James C. Soensen, Aurora, Ill., has purchased the Harry Paulos building, for \$50,000, and will occupy it for a motor vehicle sales agency and service storage station. The plant is to be enlarged by the new order. Originally, the building was a livery barn, but has been modernized for garage purposes.

H. B. May has opened a tire and accessory store at Decatur, Ill.

Aston-Hart-Parr Co. has been organized at Peoria, Ill., and offices opened in the Federal Warehouse building. The company will distribute Hart-Parr tractors in the Illinois territory, controlling the entire state, with the exception of a small section near East St. Louis. The company is composed of Bert Aston, R. C. Baker and E. A. Kegley.

Samuel Bodman, for many years distributor of the Hart-Parr tractor, with territory including Illinois and a portion of Indiana, and headquarters at Bloomington, Ill., has given up that line and has taken on the Allis-Chalmers tractor and other farm power machinery. He succeeds A. D. Landphere.

H. A. and F. C. Calhoun, Galena, Ill., have organized a motor sales company to be known as the Calhoun Cadillac. The firm will distribute the Cadillac car in the Henry county territory.

T. J. Noblett, Springfield, Ill., has been appointed distributor for the Jordan car in the Sangamon county territory.

Burwell-Harris Co., Charlotte, N. C., distributors for the Dort and Wills Sainte Claire automobiles in North and South Carolina, is preparing to move into its new building. This firm was formerly known as the Burwell-Walker Co. James O. Walker retired from the firm to become mayor of Charlotte, and James P. Harris, for two years its general manager, became vice president, the change in the name of the concern following.

Steam & Gas Auto Co., Birmingham, Ala., has been changed to the McCormack Brothers Motor Car Co., Inc., and the capital stock increased to \$50,000.

Brady Auto Co., Portland, Ore., Franklin distributor, has let a contract for the erection of a new two-story addition to its building.

Yakima Grinding Co., Yakima, Wash., has been incorporated with capital stock of \$5,000, as an automobile and repair business.

Kirkland Motor Co., Kirkland, Wash., with capital stock of \$10,000, has been organized by G. R. Douglas and Emory E. Hess.

Glen Malin and C. A. Richards, Tacoma, Wash., have purchased the Lincoln Service Station, handling a complete line of tires, tubes and accessories.

Portland agency for the Stanley steam car was announced the past week, A. L. McCauley signing up for the Portland and Vancouver, Wash., agency, with R. C. Dahlhelm of Spokane, Stanley distributor for Oregon, Washington, Idaho and Montana.

M. J. Woolach and W. L. Powell, Portland, Ore., have secured the franchise for the General tire and will handle this tire throughout Oregon.

Puget Motors, Seattle, Wash., has been incorporated by Charles H. Spencer, P. C. Davis and J. W. Albright. Capital, \$25,000.

Herschede Motor Car Co., headed by A. T. Herschede, has been named Cincinnati distributor for the Durant. The territory includes 12 counties in Ohio, eight counties in Indiana and the eastern half of Kentucky.

Mansfield-Overland, Inc., Fort Dodge, Ia., has been relieved of its Overland business, which has been turned over to the Des Moines branch. Mansfield-Overland, also Packard dealers, will change its name and take on some high grade light four car.

## Tire Mileage Guarantee No More Part of Dealer's Grief

### Rubber Assn. of America and Midwest Rubber Assn. Eliminate Old Adjustment Basis

NEW YORK, Nov. 19—After an exhaustive consideration of the subject of mileage guarantees on tires, the tire manufacturers' division of the Rubber Association of America has adopted the recommendations of a special committee providing for elimination of mileage guarantees and the adjustment of abuses which have resulted. As a substitute, manufacturers have adopted the following standard warranty:

"We do not guarantee pneumatic automobile tires for any specific mileage, but every pneumatic automobile tire bearing our name and serial number is warranted by us to be free from defects in workmanship or material.

"Tires claimed to be defective will be received only when all transportation charges are prepaid, and when accompanied by this company's claim form duly filled out and signed by owner. If, upon examination, it is our judgment that the direct cause of the failure of the tire to render satisfactory service is attributable to faulty material or workmanship, we will, at our option, either repair the tire or replace it for a charge which will compensate for the service rendered by the returned tire, based upon its general appearance and condition.

"Pneumatic automobile tires in which a substitute for air has been used, tires used when not inflated to the pressure recommended by us, used under loads in excess of those recommended by us, used on wheels out of alignment, abused or misused, used on rims other than those bearing these stamps, (—), (—), (—), or which have been injured through accident or design, are not subject to claim hereunder.

"This company does not authorize any dealer or agent to make any other additional guaranty or warranty."

### PRIZE ESSAY CONTEST

Washington, Nov. 21—Posters are being distributed by the highway and highway transport education committees, announcing prizes to be awarded grammar school children for the best essay on "How Can I Make the Highways More Safe?" and the rewards to grammar school children for the best classroom lesson for their grades which teach children safe behavior on the highways.

The contest is endorsed by the United States Bureau of Education for the purpose of conserving and developing useful material for safety education. The prizes are donated by the National Automobile Chamber of Commerce.

The posters also announce the rules of the contest and the books on safety which the committee recommends to contestants.

## 474,188 Cars, 37,332 Trucks Made in Quarter to Nov. 1

Washington, Nov. 19—Publication of production figures for the automobile industry, covering both passenger cars and trucks, has been begun by the Department of Commerce. The National Automobile Chamber of Commerce supplies the figures for its members, and the Department of Commerce obtains the

statistics from manufacturers who are not members of the N. A. C. C. The report for the quarter ended Sept. 30 shows a production of 474,188 passenger cars and 37,322 trucks, or a total of 511,510.

The figures for months follow:

	Passenger Cars	Trucks
July .....	163,998	10,601
August .....	166,393	13,076
September .....	143,797	13,645
Total .....	474,188	37,322



## CONCERNING MEN YOU KNOW

C. B. Curlee, who was formerly a salesman with the Standard Motor Car Co., distributor for the Hudson and Essex, has returned as manager of sales. For a time he was manager of the Newark, O., branch of the company.

Robert G. Elwell, formerly general manager of sales and advertising for the Allen Motor Car Co., Oklahoma, has become assistant sales manager of the Auburn Automobile Co., Auburn, Ind., and will share in the work of Charles H. Strieby, also assistant sales manager. Elwell will look after merchandising and advertising.

A. E. Vinton, assistant general sales manager of the National Motor Vehicle Corp., died suddenly the night of Nov. 8 at his home in Indianapolis.

Nelson E. Shaw has returned to the Locomobile Co. of America, Philadelphia branch, as manager of the exchange car department.

James M. Clarke, sales manager of the National Motor Car Co., Indianapolis, has resigned, and moved to Boston, where he has taken an interest in the company handling the National and the Earl Motors product for New England.

C. A. Engelman has been appointed assistant sales manager of the New Era Spring & Specialty Co., Grand Rapids, Mich.

Daniel G. Head has been made sales manager of the Culver-Stearns Co., makers of automotive electric lighting accessories, Worcester, Mass.

Henry M. Lewis, formerly sales engineer with the Hyatt Roller Bearing Co., has joined the Klaxon sales organization and is now calling on dealers and Klaxon jobbers in the eastern territory, including the states of New York, Pennsylvania, Delaware, New Jersey and Maryland and the District of Columbia.

C. J. Symington has been elected chairman of the board of directors of the Rochester Motor Corp.; LeRoy Kramer, president; P. A. Degener has been promoted to vice president and Lorimer Dunlevy named works manager.

W. B. Canis, who was formerly representative of the Advance Automotive Accessory Corp., is now representing the Reflex Mfg. Co., Fort Wayne, Ind., in Michigan and Ohio territory.

Edwin L. Wick, a Stromberg expert, has joined the force of the Pacific Automotive Service, Inc., of Portland, Ore.

John W. Denoria, Portland, Ore., a recent arrival from Chicago has assumed the duties of sales manager for the Oregon Lexington Co.

Ray L. Fairfax, Portland, Ore., formerly of Detroit, has become associated with the Praso Motor Car Co., Lincoln distributor.

Allan A. Macool has been appointed sales manager of the Flexo Co. of America, manufacturers of the Flexo, an attachment for the Ford worm drive truck.

Clyde P. Brewster has been elected vice president and general manager of the Express Plug Co., Alexandria, Va.

## October Sales in New York Show Decrease of 40 Cars

New York, Nov. 19—Registrations of new passenger cars in the metropolitan district fell off in October, 404 from the September record. Figures just compiled by Sherlock & Arnold, publishers for dealers of the Automobile Sales Analysis, show a gain in higher priced cars, of which 426 were registered in October to 331 in September; but the medium and low priced registrations dropped off from 4004 to 3595. The total were 4334 in September and 3931 in October.

The high month of the year was June, with 7017 registrations. The figures are for 10 counties in and around New York City. The summary of the year, to date, follows:

	Approximately Below \$2,500	Approximately Above \$2,500	Total
January .....	483	146	629
February .....	1,409	210	1,619
March .....	3,396	488	3,884
April .....	4,911	575	5,382
May .....	5,468	584	6,052
June .....	6,522	495	7,017
July .....	5,457	386	5,843
August .....	4,216	350	4,566
September .....	4,004	331	4,335
October .....	3,505	426	3,931
Total to date.....	39,307	3,990	43,297

## PAYS TRIBUTE TO TRUCK

New York, Nov. 21—The following statement in reference to the value of the motor truck in commerce has been made by R. E. M. Cowie, vice-president of the American Railway Express Co.:

"The value of the motor vehicle as a means of transportation cannot be overestimated; the things that it has accomplished even thus far are marvelous in the extreme. From an experience of a great many years, with all types of transportation, I have come to the conclusion that there is very much of a dis-

tinct place for the motor vehicle, either propelled by electricity or gasoline.

"Until a few years ago the express traffic of the country was conducted very largely by horses and wagons, which are in these days regarded as a slow and tedious means of transport. It is very unfortunate that horse-drawn vehicles and motor vehicles have to operate on the same highways, because the horse-drawn vehicle is very apt to keep the speed of the traffic strained back, recognizing the theory that the speed of your fleet is the speed of the slowest collier in your fleet."

## TEXAS HAS BIG OCTOBER

Dallas, Tex., Nov. 19—More than 950 automobiles were sold by the retailers of Dallas during the month of October, according to figures just announced. Of that number more than 800 were new cars and the remainder was of the second hand class. The total value of sales made by the retail automobile business was around \$1,275,000. The business done by the wholesale dealers in Dallas, according to the best figures available for the month, was about twice that of the retailers. That would make the total sales for the month by Dallas dealers about 3,000 cars. The dealers declare this is about the average and that there is every indication the total sales for the year by the Dallas dealers, wholesale and retail, will average 100 cars per day. The dealers claim that the business, including the second hand cars, for the entire year, will probably exceed those figures.

## DUESENBERG PRODUCING CARS

Indianapolis, Nov. 19—Duesenberg Automobile & Motors Co., Inc., Indianapolis, is now in production and delivering cars. It will exhibit at the New York Automobile Salon, to be held at the Commodore hotel Nov. 27-Dec. 3.

## 6262 Miles of New Highway To Be Built Under Road Act

Federal Aid to Date Responsible for 21,000 Miles of Improved Traffic Routes

WASHINGTON, Nov. 21—Enactment of the Federal Highway Act will be of great economic benefit to all lines of industry, according to opinions expressed in government circles. The President's conference on unemployment made public a statement showing that 6262 miles of new roads will be built, giving employment to more than 150,000 workers in 30 states. The completion of these roads will naturally have a tendency to increase automobile sales in the territories where sales have been restricted by inadequate highway facilities.

What the new appropriation will mean to the country can be judged by the use to which the \$275,000,000 previously appropriated has been put, according to the Department of Agriculture. Practically \$200,000,000 of that money has been put to work in projects which are either entirely completed or now under construction. The exact amount was \$199,823,427 on Oct. 31. To match this amount the states have appropriated \$265,529,090, making a total of \$465,352,517.

The total mileage of the roads under construction and completed was reported by the Bureau of Public Roads to be 27,000 miles on Oct. 31. Of this mileage 9555 miles is in projects which are entirely completed and the contractors discharged. The balance of 17,445 miles is in projects which are still under construction, but which were 69 per cent complete on Oct. 31. In these projects there is, therefore, the equivalent of 12,000 miles of completed road, so that the completed road to date totals over 21,000 miles. The average cost per mile of the roads built with federal aid has been between \$17,000 and \$18,000.

Apportionment of the fund to the states is almost the same as in the previous act, the fund being divided into three parts, one part apportioned according to population, one according to area, and one part according to mileage of rural and star mail routes. A new feature is the stipulation that no state shall receive less than one-half of one per cent of the total fund, which in this case amounts to \$365,625. This stipulation will increase the amount received by four of the smaller states, i. e., Delaware, New Hampshire, Rhode Island and Vermont.

## QUINCY SHOW IN SPRING

Quincy, Ill., Nov. 19—Although serious consideration had been given to the proposal to abandon the 1922 show, Quincy dealers have voted to hold a spring display. Twelve dealers were for a central exhibit and only three favored the individual show. Admission prices will be cut next spring, however, and it is likely that 25 cents instead of 50 will be the general charge.



## BUSINESS NOTES

**Bull Co.**, Columbus, O., is the name of a \$15,000 corporation chartered by local men to manufacture a patented spark plug, the product of C. H. Bull, who is at the head of the new concern.

**La Salle Automobile Insurance Assn.** of Ottawa, Ill., has withdrawn from active operation and has sold its business to the Continental Auto Insurance Assn. of Springfield, Ill., a reciprocal concern. High loss ratio is given as the reason for retiring.

**Harper & Harper**, dealer in Willys-Knight and Handley-Knight cars, has moved to larger quarters at 304 North Broad street, Philadelphia.

**Reynolds Spring Co.**, Jackson, Mich., has declared a quarterly dividend of  $1\frac{3}{4}$  per cent on its preferred "A" stock, payable Dec. 31, 1921, to stockholders of record at the close of business on Dec. 22, 1921.

**W. E. Jury**, Freeport, Ill., has patented a front end signal device for motor vehicles, designed to indicate to traffic officers ahead, the direction of travel. The device is operated from the steering wheel and batteries are unnecessary. The signal can be seen from all directions. It is to be known as the "High Ball Safety," and will be manufactured at Freeport.

**Speedway Engineering Co.**, Indianapolis, which has been engaged in the manufacture of valve head, parts and accessories for automobiles, was incorporated recently for \$100,000.

**Newcastle, Ind.**, Maxwell plant production is to be speeded up to 150 a day. This will be an increase of 50 cars a day over the present production and will mean the employment of additional men.

**Franklin Automobile Co.** reports that October deliveries of cars by dealers into the hands of customers exceeded the high mark set in September, which, in turn, exceeded the business done in September, 1920, by 21 per cent.

**Colmar Mfg. Co.**, Chicago, an automobile body manufacturing concern, suffered serious loss from fire recently. The fire started in the warehouse, where a large number of bodies were stored.

**Gary Motor Truck Corp.**, of Canada, Ltd., has been incorporated and is getting into production in its plant at Toronto.

**Curtiss-Iowa Aircraft Corp.** has been authorized to do business in Illinois, and of its \$250,000

capital stock \$36,850 is to be devoted to business in Illinois. The principal place of business in the state will be Monmouth and sale and distribution will be directed from there. **W. B. Swaney**, Ft. Dodge, is president, and **C. B. Sturges**, Des Moines, secretary.

**Willys-Overland** aluminum foundry will be moved within the next two months from Toledo to the allied Willys-Overland plant of the Wilson Foundry & Machine Co., at Pontiac, Mich.

**India Tire & Rubber Co.**, of Akron, O., has opened a warehouse branch under the title of "The India Tire & Rubber Co. of California," at San Francisco. The new unit will be in charge of **F. L. Ryan**, formerly sales manager, **B. F. Goodrich Co.**, at Los Angeles.

**Grow Tire Co.** has opened a southeastern branch in Atlanta, with **M. McLeroy** in charge. The branch was opened following a survey of tire trade condition in the southeast, conducted from Atlanta by **Samuel Grow**, president of the company.

**Diamond Holdfast Rubber Co.** is completing a \$35,000 addition to its Atlanta plant that will be completed and ready for occupancy by Jan. 1. The new addition will be used as an added unit to the present factory.

**Goodyear Tire & Rubber Co.**'s net sales for the seven months ended Sept. 30, 1921, were \$62,421,179, according to a report issued to stockholders. Net earnings, available for interest and fixed charges, were \$6,838,486.

**C. A. and R. L. Kendell**, Fort Wayne, Ind., formerly connected with the Chopa Piston Ring Co., of Detroit and Auburn, Ind., have entered the piston ring field with a product of their own design and make.

**Johnson Auto Body Corp.** is now located at Hyde Park, Mass.

**Hardin Brake Co.**, Portland, Ore., has been incorporated by **James F. Taylor**, **George E. Mangus** and **E. V. Littlefield**, of Portland.

**Hersch Parts Co.**, automotive parts merchants, Cleveland, O., has moved into its new building at 1966 East 55th street.

**Anderson Electric & Equipment Co.**, Chicago, Ill., is now controlled by **A. I. Appleton** of the Appleton Electric Co., Chicago, who purchased the interest from **B. J. and O. E. Grigsby**.

The gross sales will be very close to the 1920 record. The fact that gross sales will equal but not exceed the sales for the previous year in spite of largely increased production, is due to the fact that tire prices were materially reduced during last winter and spring.

The continued prosperity of General is attributed by the officers to the fact that the company has virtually confined its business to dealers rather than take on a large amount of original equipment business. Dealers' business continued to hold up well during the year.

### EARL BUYS PARTS PLANT

**Detroit, Nov. 21**—Earl Motors Co., Inc., has taken over the Jackson Metal Products Co., and the plant will be operated in the future as an Earl manufacturing unit. Most of the sheet metal for the bodies, gasoline tanks, radiator shells and enameling work will be done in the new plant. With the addition of this work the Earl car will be about 80 per cent constructed in the Earl factories.

### PATERSON POLICY FIXED

**Flint, Mich., Nov. 19**—The death of **W. S. Paterson**, president of the **W. A. Paterson Co.**, Flint, Mich., maker of the Paterson car, will in no way interfere or alter the aggressive policies of this company for the future. New models have been designed, completed and will be shown at the national shows.

## GMC Bonds Office Building To Bankers for \$12,000,000

Deal Represents One of Largest Real Estate Mortgages Ever Recorded—30-Year Lease

**NEW YORK, Nov. 21**—Pierre S. du Pont, president of the General Motors Corp., has announced that **S. W. Straus & Co.** has purchased from the General Motors Building Corp., a subsidiary of General Motors Corp., \$12,000,000 first mortgage 7 per cent serial bonds maturing serially from 1922 to 1946.

These bonds are secured by the corporation's new office building at Detroit. This building, which has just been completed, represents an investment of more than \$20,000,000. It occupies an entire block, 300 by 500 ft., is 15 stories tall, and is the largest office building in the world. This loan represents one of the largest real estate mortgages ever recorded.

In connection with the underwriting, **S. W. Straus & Co.** said:

"The General Motors building has been leased for a term of 30 years by the General Motors Corp., at an annual rental fixed for an amount sufficient to pay the combined principal and interest charges on the bonds in each successive year, after the payment of all operating expenses. Under the covenants of the trust mortgage the bonds are to be paid off in yearly serial installments, the coupons being payable twice a year, May 1 and Nov. 1. The trust mortgage requires the General Motors Building Corp., to make 300 approximately equal monthly payments to **S. W. Straus & Co.** of \$85,000 each. These payments automatically provide in advance a fund of a little more than \$1,000,000 a year from which the coupons are cashed, the balance being used for the serial retirement of the bonds.

### GERMAN FIRMS TO MERGER

**Paris, Nov. 10**—Negotiations are in hand for a fusion of the two German firms, **Benz** and **Rumpler**. The Benz company is the biggest exclusive automobile concern in Germany, with passenger car, truck and Diesel engine factories at Mannheim. It employs about 10,000 men at the present time. The Rumpler concern was one of the biggest producers of airplanes in Germany during the war, with factories in the suburbs of Berlin and at Augsburg, in Bavaria.

### IOWA ASSOCIATION MEET

**Muscatine, Ia., Nov. 19**—Enthusiastic supporters of the State Auto Trades Assn., Muscatine county dealers are planning a large delegation to the Iowa gathering in Des Moines, Dec. 8 and 9. **George Schrup**, newly-elected president of the Muscatine County Motor Trades bureau, will head the group. Other officers of the unit are **L. R. Wise**, vice president, and **George Pitchforth**, secretary-treasurer.

## Belgian Automobile Show at Brussels December 3-14

**Paris, Nov. 14**—The Belgian automobile show, the last of the European series, will open in the Palais du Cinquantenaire, Brussels, on Dec. 3, and close on the 14th of the same month. The exhibition is international and is open to the entire automotive industry, there being sections for passenger cars, trucks, motorcycles, tractors, accessories, and bodies. In the passenger car section France has a majority with 31 exhibitors. Italy is represented by five firms; America will have Studebaker, Case and Overland; England is sending two makes of cars, and the Belgian passenger car makers in the show are **Metallurgique**, **Minerva**, **Dasse**, **Imperia-Abadal**, **Excelsior**, **F. N.**, **Nagant**, **Miesse** and **Somea**. All classes are included. There are 208 exhibitors in the show.

### GENERAL TIRE PROSPERS

**Akron, Nov. 19**—The General Tire & Rubber Co. has paid its last bank indebtedness and starts the new year without one cent of unfunded debt. The final payment was made Oct. 20.

The company has had exceedingly good business during the year, as is shown by General Manager **O'Neil's** statement that production for the year will be 30 per cent in excess of the record of 1920.



# The Readers' Clearing House

## Questions & Answers

### THEORY CONCERNING ENGINE NOISES

Q—Why is it that an engine with a removable cylinder head will knock on a hard pull, even though the mixture be proper, the cooling system in good condition, cylinders free from carbon, valves in perfect shape, and the engine not in an overheated condition? Whereas, in an engine with a solid head, the water can be boiling, but the engine will not knock on a hard pull?

2—The firing order on a four-cylinder engine must be either 1-2-4-3 or 1-3-4-2; you will therefore observe that No. 1 fires when No. 2 comes up on compression. I sometimes think that on the engines with removable head the ignited gases pass through the gasket and ignite the charge before the piston gets within one or two inches of the top of No. 2 cylinder. Or, on the contrary, this same cause can be with the other firing order—No. 3 ignites as No. 4 comes up on compression; the same is true of a six-cylinder engine. What do you think of this matter?—Adolph C. Kosch, Bellwood, Neb.

1—Concerning the apparent wide divergence of performance between engines with removable heads and those with solid heads, we are not at strictest harmony with your opinions. Given two engines of equal compression ratio, identically shaped combustion chambers, identical water passages, using the same fuel with the same spark plugs, there is no logical reason why one should knock and the other one not knock. This knock you speak of can usually be traced and attributed to the characteristics of present-day fuels, which when burned in an engine of too high compression or an engine with improperly shaped combustion chambers, or improper manifolding or gas distributing system, or faulty spark plugs, produce the phenomena variously known as pre-ignition or detonation. The presence or absence of a cylinder head gasket plays no part in producing this effect.

2—The theory of the gasket leakage is best disproved by the fact that if burning gas passed through the cylinder head gasket it would leave convicting evidence in the shape of black streaks across the point of leakage. The present trend towards the use of removable heads would surely not be as widespread if cylinder head gaskets could not be depended on to maintain a perfect seal between adjacent cylinders.

### OIL PUMPING IN OVERLAND FOUR

Q—We are having trouble with an Overland four pumping oil. It came out with Lynite pistons which were removed and replaced with special oil pistons and one oil ring in each piston secured from the Overland company. Now we have fitted it with pistons to nearly a perfect fit, and also special rings; still it is pumping oil. Wish to know if all Overland fours are subject to this trouble, and if

### THE READERS' CLEARING HOUSE

*THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.*

*In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.*

*Emergency inquiries will be replied to by letter or telegram.*

*Addresses of business firms will not be published in this department, but will be supplied by letter.*

there is some way to eliminate it?—Bingele & Wren Garage, Steedman, Mo.

This trouble is not common among Overland fours. We suggest that you micrometer the cylinders and determine if the cylinders are perfectly round. If they are, the new style Overland cast iron piston will eliminate this trouble. Regrinding will be necessary if the cylinders are not circular. Use the rings furnished by the Overland company.

### RACING CARS AND BALL BEARING CRANKSHAFTS

Q—How many cylinders did Tommy Milton's Duesenberg racer have when he made 155 m.p.h. at Dayton Beach, Fla.?

2—Give specifications of this car.

3—What gear ratio has the average racing car, such as the Frontenac eight?

4—Give the reason why some of the racing cars are built with ball bearing crankshafts.

5—Are there any passenger cars built with ball bearing crankshafts?

6—Give the advantages of them.

7—What type of rear axle has the six-cylinder Nash car?—Frank Sinka, Algoma, Wis.

1—Sixteen cylinders. Two independent eight-cylinder Duesenberg engines, each connected to one rear wheel, were used.

2—The complete specifications are not available. The specifications of the independent engines have been published before and other than this the car was of freak design, having no transmission or differential, for the reason that the engines being independently linked to the rear wheels, a transmission or differential would have been superfluous and would have resulted in lowering the speed.

3—The average is 2½ or 3 to 1.

4—For two reasons: one, to cut down friction and aid high engine speed, and, second, to eliminate any chance of lubrication trouble to as great an extent as possible.

5—No. Ball bearing crankshafts in passenger cars were abandoned a few years ago.

6—They make a very free running engine, for the reason that the friction of the three or more main bearings is practically eliminated.

7—Semi-floating.

### REMODELING JACKSON TOP

Q—Supply the following information on the Jackson sport car equipped with a California top:

1—Can a regular touring top be used on this car in place of the California top?

2—If so, would it mar the looks of the car to any great extent?

3—Would the cost be nothing more than for a new shield, frame, top and labor?

4—Where could these be secured, or would it be best to have a local trimmer do the job?

5—Is the 7R Continental engine used in this car the best grade the Continental people make?—B. T. Clifton, Cedar Bluff, Ark.

1—Yes.

2—No.

3—The car would have to be fitted with top irons throughout, in addition to the above named changes. The cost of the entire job should not exceed \$150.

4—The parts can be secured from any of the leading body hardware firms; the local trimmer is probably equipped to do this work and could also secure the necessary parts.

5—The 7R is one of several types of engines put out by this concern, all of which are considered quality products. We are unable to say which is the highest grade, as many of the differences in design in their engines are due to the purpose for which the engine was designed and not to price consideration.

### CUTTING DOWN WHEELS ON CADILLAC CAR

Q—Give us the address of a company that builds sport bodies for heavy cars and also cuts down wheels. We have a 1914 Cadillac that we would like to convert into a sport roadster.

2—Do you think it would be advisable to put 32 by 4½ wheels on this car?

3—What speed would the job be capable of with 32 by 3½ wheels, using the extra high gear of 2½ to 1?—Robt. T. Schively, Sciola Auto Repair Co., Sciola, Ind.

1—The names of concerns capable of doing this work are being supplied by mail.

2—Unless you intend to remodel the fenders, dropping them down lower, the gap between them and the wheels will present a very awkward appearance.



Aside from this, there is no reason why the small wheels cannot be used to advantage. Not wishing to remodel the fenders, we would suggest that you reduce the wheel size to 34 by 4½ in.

3—About 55 m.p.h.

### CHEVROLET OIL PUMP LOSES PRIMING

Q—Why does the oil pump on a "Baby Grand model F A Chevrolet" keep continuously losing its oil priming? The pump is in perfect condition and the joints do not leak air.

2—Is an outside oil pump like the Chevrolet satisfactory?

3—Does Clark-Turner make an offset piston such as is used in the Buick engine?

4—Would a piston with a pin directly in the center give satisfactory results in an "E 45" Buick where the offset pin is used?—Leonard Stairrett, R. 7, Columbus, Kan.

1—As a rule, the Chevrolet does not give trouble in this respect. Despite what you have to say regarding the condition of the pump and the piping, an

air leak is indicated. This need not necessarily be at one of the couplings, but may be caused by a minute crack or break in the piping. We would advise you to remove all of the oil tubes and test them carefully with air pressure, submerging them in water to make the test.

2—As intimated above, the system has given uniformly satisfactory service.

3—No.

4—The concern in question makes pistons with centered pins, and reports indicate that they give satisfactory service when used in the E 45 Buick.

### ADJUSTING MILLER RACING CARBURETER

Q—Give instructions for adjusting Miller racing carbureter?—Harold W. Ray, Thendara, N. Y.

The Miller carbureter is fitted with only one adjustment, which is for idling. The adjustments for the whole throttle range are effected automatically, and

only by changing the jet combination can you secure a difference in performance. We suggest that you communicate with the makers of this device if it is not giving satisfactory service.

### NO SPECIFICATIONS OF SMALLEST CAR IN WORLD

Q—We are planning to build a diminutive speedster, using motorcycle engine, airplane wheels, etc. There was an illustration of one in Motor Age some time ago and we would like to inquire whether you can supply us with its specifications or inform us where the parts may be obtained?—Arthur M. Schrum, Hibbing, Minn.

The car in question was manufactured by Robert P. Breese, and it was illustrated on page 52 of the June 9 issue of Motor Age. The specifications, other than that it was powered with a Harley-Davidson motorcycle engine, are not available. It was manufactured by Robert P. Breese, Frisco Racing Car Co., San Francisco, Calif.

## General Test for Field Windings

Q—Inform us whether there are any methods of testing generator field coils without removing them from the generator. Is there anything on the market in the nature of a growler that can be slid into the field ring in place of the armature, or a device for measuring the magnetic flux of each pole face?

2—We are using a millivolt drop test and measuring the current consumption in each field coil with inaccurate results. An occasional generator, after a time in service, will fail to build up, with apparently everything in perfect condition. We can attribute this effect to nothing but unbalanced field windings.—Bauer-Dooley Battery Co., Mobile, Ala.

1—We know of no such device. However, it should not be necessary, as passing a battery current around the field windings should create enough magnetism in the pole pieces for comparative testing purposes. For instance, with current flowing, it should require about the same effort to pull a piece of iron away from each pole face.

2—It is possible that you are not using the millivolt test correctly. The illustration shown in Fig. 1 indicates the proper and the improper method. The thought occurs to us that possibly you are using the meter in series with the windings, as shown at point B. While this method would show a decided discrepancy, it would not show slight variation. The meter should be used in shunt, as shown at point A. One or at the most, two cells of dry battery should be sufficient for the test, and the meter line should be equipped with a key or some kind of quick acting switch, as shown at the point C. The wires from the battery to the ends of the field windings should be of generous size to avoid any chance of a large voltage drop between the points, and, when making the test, the circuit from the battery around the windings should be completed at least 10 seconds before the millivolt key is depressed. This gives time for the reaction of the field to have taken place and

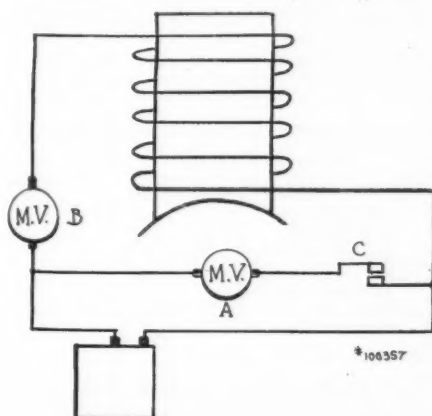


Fig. 1—Correct and incorrect way to make millivoltmeter drop test

subsided. Upon depressing the key, a millivolt reading will be obtained. Of course, the test can be nothing other than comparative, but as all the fields of a generator or starting motor never fail at the same time, a comparative reading is all that is required. The field should be tested with a test lamp before the millivolt meter is resorted to, for the reason that, if it is open, the meter is very likely to be damaged.

On the other hand, the heavier the short circuit of the field winding, the less liable the millivolt meter is to be damaged. This latter statement can be proven by bridging a wire across the battery wires and reading the millivolt drop. If the wire is a coarse one, such as that in the field windings of a starting motor, the indication shown by the meter will be very small. If, on the contrary, it is of a high resistance, such as the windings of a generator, the millivolt value will be large.

In making the test, the key should not be pressed down firmly, but only tapped to bring the points together, and, if the meter gives an indication of reading be-

yond its range, the higher ranges of a combination instrument should be used.

Regarding the trouble you have had with occasional generators: we believe this can be traced to armatures rather than to the fields. Many armatures will test clear on the growler when they are cold and show a decided ground after they have become heated up. When an armature is suspected, it is well to leave it on the growler, covered up tightly until it becomes so hot that it is nearly uncomfortable to the touch.

As said before, this will many times show up grounds which are not apparent in the cold armature. Of course, reason must be used when doing this and the armature not allowed to heat to the point where the leads will be loosened in the commutator. Another armature fault which is very difficult of detection is grounding while the part is in motion and clearing when it comes to rest. The reason for this peculiarity is that the coils have a slight movement in the slots and, when the armature gets to spinning, they have a tendency to fly outward.

Now, it is very easy to conceive of a condition where one of the coils, pressing outward strongly on account of centrifugal force, bears on a sharp point of the armature core to such an extent that it is grounded. Of course, when the armature comes to rest and the coils return to their normal position, such a ground is cleared. A very good test for the condition is to remove the brushes from the generator, speed the engine up and apply one lead of a 110-volt test circuit to the iron of the generator frame and the other lead to the commutator. If the armature is grounded the test light will light, or at least glow. Many times light short-circuits or grounds can be cleared by raising the faulty coils up and inserting pieces of Empire cloth or fish taper under them and shellacing the repaired spot heavily.



### EXPLANATION OF SIMMS-HUFF REGULATION

Q—In the Oct. 6 issue, page 32, description of Simms-Huff Maxwell generator, we cannot exactly follow the parts explaining the regulation. As we understand it, the series fields produce the magnetic fields through which the armature revolves, which, in turn, generates the electricity for the system. The output is held down by the shunt fields' being wound in the opposite direction, thus weakening the magnetic fields. It would seem that when the generator produced too much electricity, the regulator points would open, thus sending all the shunt field current through the resistance, which would have the effect of weakening the current to the shunt field, this in turn allowing the series field to make a stronger magnetic field and thus producing more electricity instead of less. Will you please straighten us out on this point?

2—In some systems the instructions say: in case of a broken battery lead or removal of a battery from the car, the binding post on the generator should be grounded to prevent the latter's being burned out. Could you give general instructions as to how, to proceed, should this happen on a system? We are not fully posted on this point; for instance, it would be fairly easy to inform ourselves whether a generator was regulated by shunt field or third brush, and whether a grounded or a two wire system.

3—In the Delco system used on the Hudson 45, the resistance coil on the top of the governor case does not heat up if the switch is left on for 10 or 15 minutes when the engine is not running. We understand it is supposed to heat up to protect the ignition coil. The resistance does not seem to be short-circuited in any way. Is this normal?

4—Will you explain the theory of offsetting the wrist pins, as spoken of in the description of the Buick 4? We would like to understand this, so as to be able to know, should we encounter one that had been assembled reversed.

5—Should the pistons be installed reversed? Do you believe it could be detected in the running of the engine?—John M. Thomas, 316 So. 17th St., St. Joseph, Mo.

1—We believe your conclusion can be traced to a typographical error in the article in question. Referring to the second paragraph: "The series windings may also be called series packing coils, etc." The error here is in the word "packing," which should have been "bucking." In view of the foregoing, your confusion is very natural. The action of the system is as follows:

As soon as the armature begins to revolve, the windings cut through the faint lines of magnetic force that are found in all field poles after they have once been magnetized. This is what is known as residual magnetism. The path of this faint initial current is from binding post No. 2 through the resistance and shunt winding of the regulator cutout back through the ground and also back through the regulator binding post No. 3 and generator binding post No. 3, through the shunt windings to the ground at point X on field pole A. This is the current which energizes the shunt field windings in the proper direction for charging the battery, although it does not pass through the latter.

As the current increases in strength, the cutout points are closed and the current divides, part of it passing to the battery. It is at this point that the auxiliary regulation of the reverse series fields comes into play. It will be seen

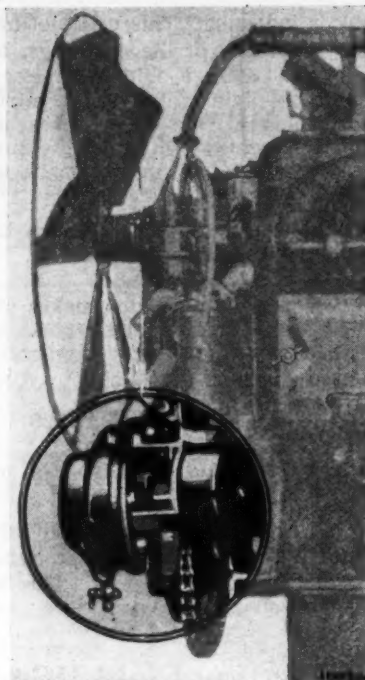


Fig. 2—Left front side of engine used in 1916 4-cylinder Studebaker car. It is suggested that a high tension magneto be driven from the pump shaft, shown in the circle

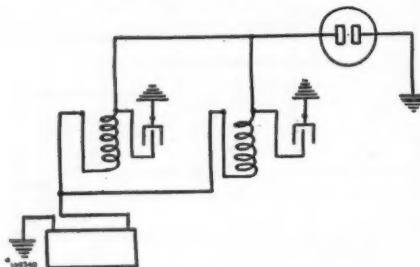


Fig. 3—Suggested method of operating two spark coils on one battery and one set of breaker points

that the only way in which the current can get back to the negative generator brushes, Nos. 1, 3 and 5, is by way of the series fields. These are wound in opposition to the shunt fields and have the effect of neutralizing the magnetism set up by the latter.

Now when the regulator points open and introduce the resistance into the shunt field instead of the series fields, having the effect of increasing the current output, the exact reverse is the case.

2—On all three brush generators of the single wire variety, it is safe to ground the machine in the way mentioned. Two-wire, three-brush generators should have their terminals connected together. On such generators as the one first above discussed and the earlier models of North East generators, short-circuiting by grounding or connecting the terminals together would prove disastrous. Although the instructions to short-circuit for protection apply to the majority of generators on the market, we consider that the better plan is to lift the brushes from the commutator all round and tie them up securely.

3—If the battery is up to full charge and the engine comes to rest with the

breaker points in contact, we know of no good reason why the resistance unit does not heat up. Many times, owing to a tight place in the bearings, an engine will come to rest time after time in such a position that the breaker points are separated. We believe that if you check this, turning the engine over by hand so as to be certain that the breaker points are in contact, you will find that the resistance unit heats.

4—The theory of the offset wrist pin is that it relieves the thrust of the piston against the cylinder wall at the time of the explosion and thus minimizes or eliminates piston slap.

The wrist pins in the Buick engine are offset 3/32 in. toward the camshaft. They are marked with arrows on the skirts. In assembling, be certain that the arrows point toward the camshaft.

5—An engine in which the pistons are assembled reverse, has heavy piston slaps in all four cylinders. The effect cannot be mistaken.

### MISCELLANEOUS QUESTIONS ON 1916 STUDEBAKER

Q—What is the maximum speed of a 1916 Studebaker four-cylinder engine and what changes should be made to increase the speed?

2—Can a Bosch magneto be installed on this engine?

3—Can two coils be operated from one set of breaker points?—R. H. Coven, 130 Cleveland St., Elyria, O.

1—This data is not available. We should estimate between 1800 and 2000 r.p.m. Installing larger valves and shortening up the intake manifold will increase the speed at no great expense.

2—The installation will be difficult. Referring to Fig. 2; it will be seen that the only point available for a drive is the short section of pump shaft. A sprocket and chain or silent gear and chain drive can be arranged from this point. This will necessitate the mounting of the magneto on a special bracket.

3—Yes. An arrangement such as that in Fig. 3, should operate. If excessive sparking occurs at the breaker points, a third condenser, bridged across them, should eliminate it.

### SOLUTION FOR ELECTROLYTIC RECTIFIER

Q—We have read in Motor Age and elsewhere of electrolytic rectifiers for charging batteries, made up of sheets of aluminum and lead or aluminum and iron. We have tried to make one but do not seem to be able to get the right solution and are writing to inquire what it is.—W. Chester Baker, 220 Hermann St., San Francisco, Calif.

Most any sort of solution should work satisfactorily, as the operation of the apparatus depends upon the forming of oxide on the aluminum plate. As aluminum oxidizes rapidly under nearly all circumstances, the solution used should really not be of great importance. Two solutions have been published in Motor Age in the past. These are sodium bicarbonate (baking soda) and sodium phosphate. Too much of the chemical cannot be used, as the distilled water will only dissolve a certain amount, giving what is called a saturated solution, which is necessary.



### CADILLAC-DELCO 1912 SYSTEM WRONGLY CONNECTED

Q—We have attempted to install a Delco 6-24 volt outfit on a 1912 Cadillac, as shown in accompanying sketch, (Fig. 11.) When the lights are on, the ammeter shows a discharge, regardless of whether the engine is running or not. Changing the leads does not seem to remedy the trouble. Also the cutout does not work. With the engine running, it fails to close. After closing it and stopping the engine, it fails to open, which action, of course, runs down the battery. Publish a diagram and explain what the trouble may be.—Adam Roney, Globe Motor Co., Powell, Wyo.

The illustrations shown in Figs. 4 and 5 will be referred to throughout the following explanation. In the first place, you have connected up the generator through the starting connections instead of the generating connections. Fig. 4 illustrates this very clearly. It will be seen that terminals 3 and 4 are connected to the heavy series windings and to the brushes. If the apparatus functioned as a generator at all, it would be as a series machine, and it would have to be run at a high speed.

Making your connections to terminals 1 and 2 would better the matter somewhat, but even in this case the apparatus would still run as a series machine, which method is incorrect. This all accounts for the peculiar action of the cutout and ammeter. The faint current set up by the series generation is not sufficient to energize the shunt windings of the cutout, and, of course, it fails to close. When you close it by hand, the voltage of the battery is greater than that of the generator, and a discharge takes place, as indicated by the ammeter.

This is quite correct for these connections. If you will short-circuit terminals 1 and 2 with the engine running, we believe you will find that the generator functions, but at an excessive current output, for the reason that there is no regulation other than that of the series fields, which are wound in opposition to the shunt field. If the ampere hour meter is in working order, we recommend that it be connected up. If it is not, introduce some resistance between terminals No. 1 and 2.

This should be of such a value that the generator output is held to 15 amp. at high engine speed. Resistances and methods of making them were illustrated in this magazine in the June 4, 1921,

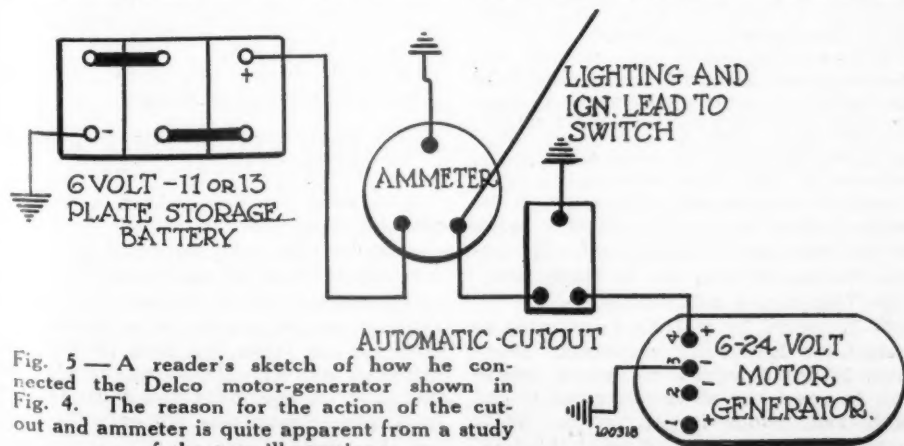


Fig. 5—A reader's sketch of how he connected the Delco motor-generator shown in Fig. 4. The reason for the action of the cutout and ammeter is quite apparent from a study of the two illustrations

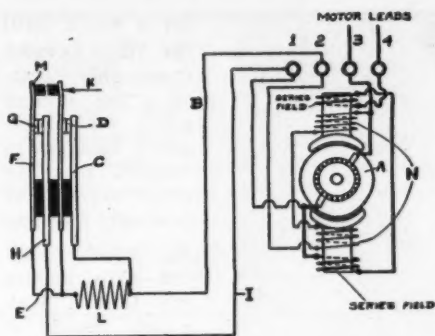


Fig. 4—Windings and connections of the Delco motor-generator and the Sangamo ampere-hour meter used on the 1912 Cadillac

issue. Your cutout connections are correct, but we are at a loss to understand why you have grounded the ammeter. This should not be necessary.

The foregoing explanation is based on the assumption that the motor generator is numbered consecutively from left to right. However, the numbering is not a reliable guide, for the reason that some of these old generators were not numbered consecutively and some of them were numbered from left to right.

It is not at all a difficult matter to determine the series and shunt windings of the apparatus. First connect a lively battery to the terminals 3 and 4, having the machine disconnected from the engine so that it is free to motor. After having tried terminals 3 and 4, try 1 and 2.

It will be found that the machine will run at high speed on one pair of terminals until the other pair is connected together, in which case it will immediately slow down but deliver considerable power. In the first case it is running as a straight series wound motor and the connections are made to the series field. In the last case it is operating as a shunt wound motor and the terminals shorted are connected to the shunt and are the ones between which the resistance is to be inserted. If an ammeter is used in the foregoing test, it will be found that the series connections pass much more current than do the shunt connections.

It should be understood that the apparatus will not operate as a starting motor when applied by a 6-volt battery.

When correctly connected, the apparatus should deliver 5 amp. at 500 r.p.m., 12 amp. at 1000 r.p.m., and 17 to 22 amp. at 1500 r.p.m.

### CONVERTING A CHEVROLET 490 INTO RACING CAR

Q—Is it advisable to strip a Chevrolet 490 down as a racing car?

2—How much could be rebored from the cylinders and still be safe from weakening the same?

3—Would it be necessary to enlarge the valves and, if so, how much do you advise?

4—Would you put heavier valve springs on the valves after they had been enlarged?

5—Is it necessary to increase the speed of the engine? If so, how would you do so?

6—What gear ratio would you advise us to use in order to attain a high speed on the average country road?

7—This car has 30 by 3½ tires on it. Would you advise putting 31 by 4 tires on?

8—In fixing this car over, what kind of a magneto would you use, if one was used in the place of the battery and the generator, in which the battery was taken out and the generator and the starter were taken off?

9—Would you change the breaker box if the present one gave trouble at times and, if so, what kind would you use to get the best service?

10—Could the crankcase be enlarged to hold more oil, and would it be advisable? If so, how would you enlarge it?—Charles Sanders, Grinnell, Ia.

1—Yes.

2—1/8 in.

3—Would advise enlarging the valves to 1½ in. diameter.

4—Yes.

5—The engine speed should be increased by a careful balancing of all of the reciprocating parts, and a reduction of friction wherever possible. The connecting rods should be lightened as much as possible, the pistons also carefully balanced. The timing should be advanced one tooth.

6—A 3-to-1 gear ratio would give good results on the average country road.

7—No.

8—It is contrary to our policy to recommend any certain device; however, any of the well known, well advertised high tension magnetos would serve admirably on this car.

9—Refer to Answer 8.

10—Would not recommend enlarging the crankcase, but would provide an additional source of oil by constructing an outside oil tank equipped with pump from which fresh oil can be drawn to replenish the supply in the crankcase.

### TIMING WEIDLEY ENGINE

Q—Who were the first motor car manufacturers?

2—Give valve timing on Weidley engine as used in 1916 32-B Chalmers.—Robert I. Scott, Lincoln, Neb.

1—Panard & Renault in France. In the United States there is much difference of opinion as to who were the originators of the motor car. Contenders for these honors are Duryea, Selden, Haynes.

2—The valve clearance on this model engine is .003 warm. The valves are timed as follows: intake opens 5 deg. late, closes 45 deg. late; exhaust opens 45 deg. early, and closes 15 deg. late.



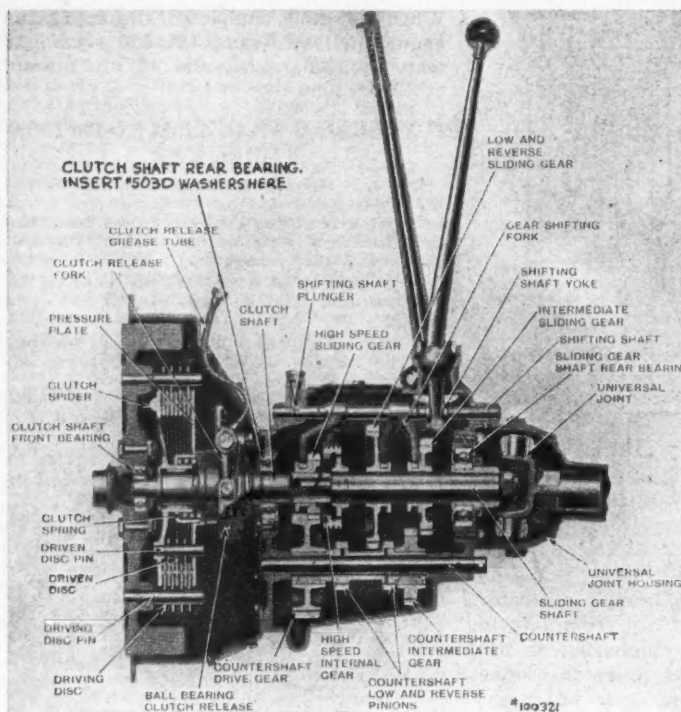


Fig. 6—Cross-sectional view of transmission used in Dodge Brothers cars. End motion in the clutch shaft is remedied by installing spacing washers (stock No. 5030) at the point indicated

#### ATTACHING OIL PAN TO MODEL M HUDSON

Q—On a 1918 Model M Hudson, about two-thirds of the holes in the upper half of the crankcase have the threads so badly stripped that it is impossible to bolt the bottom up tight. This engine is so constructed that we cannot drill the holes through, and use bolts instead of studs. The engine uses about one gallon of oil a week.

2—When the engine is started the generator usually does not start charging at once, but makes a clicking noise until the engine is greatly slowed down; then it starts charging perfectly.—J. M. Asher, 443 Eaton St., Hammond, Ind.

1 and 2—We know of no reason why the holes cannot be tapped out for a larger size cap screw. This is the method pursued by the local Hudson service station. Of course, it will be necessary to remove the engine and place it on the bench to do the job right. However, as we never advocate makeshift jobs, we recommend that it be done this way. The clutch at the front end of the motor-generator is slipping. Sometimes it is possible to dress the jaws of the clutch down with an oil stone and install over-size rollers. By far the better plan, however, is to install all new parts.

#### MORE OIL PUMPING TROUBLE

Q—Why do some Dodge engines pump oil when the piston clearance and ring fit is perfect? This sometimes happens to a slight degree on new cars.

2—What causes them to leak compression by the rings, when all kinds of rings have been tried and carefully fitted? The leaks do not seem to effect the power, but they can be heard when driving the car.

3—Do you believe it possible for cylinders to be warped?

4—How can end play be removed from the Dodge clutch?—Edgar Best, Fairbury, Ill.

1—We doubt that they do. It is true that new engines sometimes pump oil

is a case for regrinding.

4—By inserting No. 5030 washer just ahead of the clutch shaft bearing at the front end of the transmission. This is an annular ball bearing, and it will be necessary to remove the transmission and clutch from the car in order to get at it. The assembly is illustrated in Fig. 6. The No. 5030 is the Dodge stock number and you should have the washer in your stockroom.

#### IMPROVING PERFORMANCE OF MONROE CAR

Q—On a 1917 model M4 Monroe touring car, engine  $3\frac{1}{4}$  by  $4\frac{1}{2}$  in., equipped with overhead valves and aluminum pistons, we wish to rebuild the engine and are writing to ask your opinion of the practicability of the following:

We wish to have the cylinders reground and new pistons fitted. Will it be practicable to grind off cylinder block  $1/16$  to  $1/8$  in. and raise compression?

2—What is the compression ratio of this model?

3—Would it be possible and practicable to install a new camshaft, increasing the valve lift by  $1/16$  in? If so, where could such a camshaft be obtained?

4—The present gear ratio is 53/11. In the comparatively level country and hard surfaced roads of central New York state, would a 53/13 gear ratio be practicable?

5—If these changes were made, what would be the effect on gasoline mileage?—David T. Corp., Monongahela, Pa.

1—Not knowing the thickness of the water jacket, we cannot say how much of the head can be ground off. We advise that the  $1/16$  in. cut be taken first.

2—This data is not available.

3—It should be entirely practicable to install the higher lift camshaft. However, before doing so, we would advise you to ream the valve seats out to the limit and install larger valves. It is quite possible that the effect of this pro-

cedure would almost be equal to that of the higher lift cam, and the expense will be much less. The second part of this query is being replied to by mail.

4—The 53/13 (approximately 4.8 to 1) gear ratio should be practicable; in fact, we believe that this machine will stand an even higher ratio, possibly as high as 3.75 to 1.

5—This is problematical. Enlarging the valves or installing the higher lift camshafts will better engine efficiency, as will also the raising of the compression. On the whole, we should say that the fuel economy should be bettered, but how much it is impossible to state.

#### WE STAND CORRECTED

In the Oct. 6 issue of MOTOR AGE in the Readers' Clearing House section we noted a query from the Smith Motor Sales Co., Casper, Wyo. Inasmuch as they want to rebuild a Ford engine so as to attain a speed of 4000 r.p.m., and you say this is impossible, we wish to differ with you, because we have a Ford redesigned for speed in which the engine turns up 4000 r.p.m. I would like to hear from some other Ford racing car owners regarding their viewpoint on this, as I know of one or two others that have attained over the 3600 r.p.m. mark.

In question seven of the same inquiry: they wish to lighten the Ford connecting rod. The Ford Motor Co. has recently produced a new rod that is nearly half a pound lighter than the old one and plenty light enough for racing purposes. My experience has been that it is not so much a matter of lightening the rods as it is to get them in perfect balance with each other and also to get the whole engine in balance. This means a lot of slow close work in balancing, but the results will be much greater than trying to get everything light—not that lightweight parts should not be used, but that the balancing part of it should be given a lot of attention.—Louis Rogers, 3114 Victoria Ave., Regina, Sask., Canada.

Mr. Rogers is to be congratulated upon having attained a marvelous, almost miraculous, engine speed. We receive reports of high engine speed from time to time, but are rather inclined to question them without the evidence of a dynamometer test. One concern engaged in the manufacture of Ford racing car parts advises us that they frequently attain speeds of 3200 r.p.m. with an eight-valve head, and 3500 r.p.m. with a 16-valve head. An odd circumstance is that they attain better car speed with the lower revolutions per minute.

#### KEEP FIRE EXTINGUISHER HANDY WHEN BURNING CARBON

It is good practice to keep a fire extinguisher within easy reach during a carbon burning job. Many times an incandescent lump of carbon as big as a small marble will be blown out of the cylinder and will lodge near the carburetor. If the latter has been flooding or dripping, a lively blaze may be started instantly. A cool head and a handy fire extinguisher may save not only the car, but the whole shop.



## Mystery Tales

*EVERYBODY* likes a good detective, ghost or other kink of a mystery story in which the solution of the puzzle is given on the last page. When the mystery has to do with your business it is doubly interesting. Everything is mysterious until it is explained and, by the same token, everything is simple and easily accounted for after the reasons are discovered. Watch these columns. Your mystery may be solved in them. But don't wait. Send in the plot of your story and give some other mechanical sleuth a chance to use his gum shoes on it.

### MYSTERY TALE, NO. 101

#### Temperamental Conduct of Hudson-Delco Distributer

We have a mystery which we cannot solve and your assistance will be greatly appreciated. The car in question is a Hudson 1920 Super Six, which started bucking just as if there was a gas stoppage. The whole system was gone over, with no results. We at last found that it was an intermittent breakdown of current at the plugs. Switch, wiring, distributor and breaker points were all checked over, new condenser, new resistance coil on the distributor housing fitted, new distributor head and rotor fitted—and still the same trouble. Finally all the grease was cleaned out of the governor, all parts carefully washed in gasoline and reassembled with pure vaseline. Now comes the mystery part: The car will run about 200 miles as well as it ever did, and then the bucking comes on. By accident we have found an immediate remedy. It is to pour about a thimbleful of gasoline right on top of the ball race in the breaker box. This is an immediate cure and the car will then be all right for about another 200 miles. We had this car on a 1,000-mile tour and had to give it this treatment about six times. Speed makes no difference, as we can keep up an average of 45 m.p.h. for long distances, and never a miss.—A. E. R., Winnipeg, Man., Canada.

The foregoing would seem almost to border on the occult. However, we are sure that there is some simple explanation. Reference to the illustration of the breaker box shown in Fig. 7 will make the following theory more clearly understood. A genuine Delco breaker arm is fitted with a piece of fibre which bears on the cam. This is not true of some of the replacement parts offered on the market, ending in a piece of hardened steel. The arm is grounded through both the springs and the bearing at the pivot pin end. For argument's sake, we will say that the spring has become coated with a light coating of grease or oil, as has also the pivot pin.

It is plain to be seen that this would result in a very poor ground. Now we will say that the fibre shoe, if there is one, is worn down so that the metal of the breaker arm is in contact with the cam, or that a replacement part with a steel shoe is being used. In either case the cam and the bearing would form a ground connection. Consider now what would happen if the grease in the bearings became gummed. An imperfect

ground would result. It is quite possible that the thimbleful of gasoline cuts the gum and cleans the bearings so that the current can pass.

The correctness of the foregoing theory can be easily checked by positively grounding the breaker lever. The simplest way to accomplish this is to use a pig tail of flexible wire (a length of common lamp cord will do) connecting one end to the breaker lever and fastening the other under the nearest screw. While we cannot state positively that it will overcome the difficulty, we firmly believe that it will do so. At any rate, the expedient is simple and harmless and will cost nothing to try.

Other theories will be welcomed.

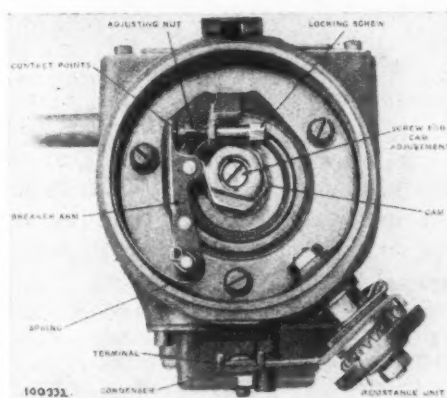


Fig. 7—Delco breaker box, part of the distributor assembly of the 1920 Hudson Super Six. Note that the breaker arm is fitted with a fiber shoe

### MYSTERY TALE

#### The Tale of the Temperamental Horn

We have a 1921 Ford equipped with the regular Ford electric horn which receives its current from the magneto. On another Ford, this horn is alright, but it refuses to sound on the car in question except while the engine is running at a certain speed and does not sound right even then. Three new Ford horns acted the same way when wired to the magneto and grounded on the engine. Could the former owner of this car have changed the alternating current to a direct one and, if so, how did he do it and how can it be remedied? While this engine will not start on the magneto, unless the starter is used many times, it always responds immediately to the battery.—J. F. S., Sterling, Ill.

We believe the solution of this mystery to be simple and obvious, but wish to

give the Mystery Tales fans a chance to keep in training. We are supplying the answer to the riddle by mail direct.

### REBUILT FORD MISSES AT HIGH SPEED

Q—We have bored out the intake and exhaust ports on a Ford block and installed Fordson valves and Deluxe pistons. The car misses at high speeds on the road, but does not when idling. It is equipped with the standard carburetor.

2—Do we need a larger carburetor?

3—We also tried to use a Bosch magneto with new worm gear drive but, due to faulty gears, it twisted off the two dogs on the camshaft gear nut. As the camshaft gear is pinned on, the valve timing must be alright. We are now using Ford ignition and we are sure it is alright. Can you solve it? In a previous issue we saw where a reader's car had a peculiar knock in the engine at all speeds. We have had the same trouble and found water in the cylinder. This trouble is common in a steam engine under similar conditions.—H. L. Barker, Tiverton, R. I.

1—You say the engine misses at high speeds. This is rather indefinite, as you do not say what you mean by high speeds. The missing may be caused by a number of things, but we believe it to be due to faulty ignition. By this we do not necessarily mean that the system is inadequate for the high speeds, but that some small part is not functioning properly. Among the points to check are the commutator, noting the condition of the fibre track between segments, the condition of the roller and the tension of the spring. Coil adjustments should next be checked to see that they are all as nearly uniform as it is possible to make them. This had best be done on a regular Ford coil testing apparatus. The next point—or possibly it should have been the first—is the width of the spark plug gaps. From what you have to say about the engine idling well, we are under the impression that the gaps are a trifle too wide for good high speed performance.

2—Not necessarily. While a larger carburetor would give better acceleration and, possibly greater maximum speed, we know of no reason why it should eliminate the missing.

3—You are quite correct about the timing. If the valves were out of time as badly as the break you speak of would have made them, the engine would not run at all.

We thank you for your comment on the peculiar knock. We have also had experience with water in cylinders and have found that the knock occasioned thereby does not persist very long after the engine has become heated, for the reason that what little water seeps into the engine is instantly vaporized and blown out. In fact, the tendency is for the exhaust to blow out through the water jacket instead of the water seeping in. The instance cited—that of the steam engine—is not quite parallel, for the reason that the temperatures do not rise nearly so high in a steam engine and neither are such terrific pressures developed.



# The Accessory Show Case

## New Fitments for the Car

### RUB-TEX RUBBER COMPOUND

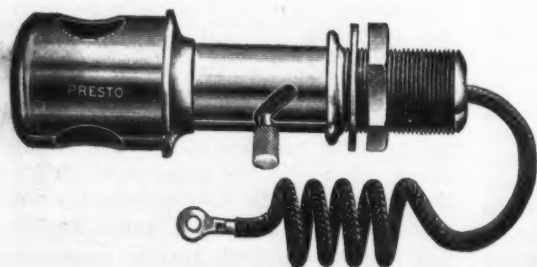
The Rub-Tex is a rubber compound battery box made to replace those of wood containing hard rubber jars. The Rub-Tex compound is a secret one which does not become brittle and is claimed to stand the freezing test. In addition, it is claimed that these boxes overcome the difficulties encountered with pin-holes, blow-holes and other forms of leakage, which are common with hard rubber products. In order to overcome these defects, the Rub-Tex box is made up by building up the battery box by hand, thereby laminating each piece of rubber and overlapping each piece at the corners. The boxes are then cured under very high pressure. Rub-Tex Products, Inc. Indianapolis.

### DASH LAMP FOR FORDS

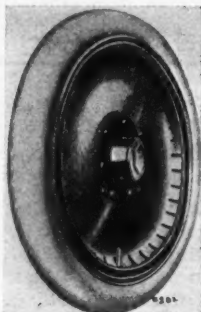
This dash lamp for Fords is made of heavy brass, nickel plated. It is furnished complete with two candlepower, 6-8 volt bulbs. The extra long threaded shank with nut and washer permits this lamp to be installed on either an all-metal dash or wood dash, metal covered, by boring a  $\frac{3}{4}$  in. hole in the dash, inserting the shank of the lamp and tightening the nut at the back. Price \$1. Metal Specialties Mfg. Co., 338 N. Kedzie Ave., Chicago.

### PERFECTION LAMINATED STEEL DISK WHEEL

This wheel is made up of laminations of several steel disks welded together, giving strength and lightness. The shape and "cutouts" in the outer diameter of the disks, next to the rim, as shown in the illustration, allows for resilience in this type of wheel, the load being suspended as by a wire wheel. The valve stem extends through the outside, facilitating inflation of tires. The wheels can be mounted on the wood wheel hubs and are demountable for tire changing. Sold in sets of five at prices ranging from \$42.50 to \$62.50. Perfection Motor Parts, 418 Lightner Bldg., Detroit.



Dash lamp for Ford



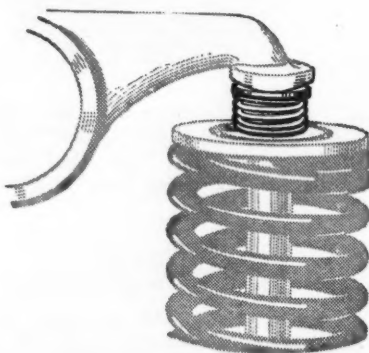
Perfection laminated steel disk wheel



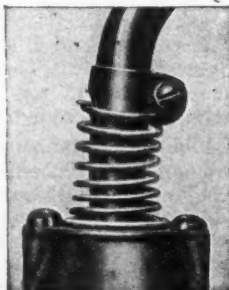
Brinck carrier and step plate scraper

### LANE ROCKER ARM SILENCER

This is a device for attachment to the overhead valves on almost all engines using this type of valve and is claimed to eliminate all tapping noises. Made in two sizes,  $\frac{5}{16}$  in. and  $\frac{3}{8}$  in. Price \$2 per set. National Equipment Co., Commercial Trust Bldg., Philadelphia.



Lane rocker arm silencer



Anti-rattler for Chevrolet 490 gear shift lever, made by the Stewart Mfg. Co., Oakland, Calif.

### CLYMER SPOTLIGHT OPERATES THROUGH WINDSHIELD

The patented features are the placing of the spotlight bracket through the windshield glass and the use of a ball joint in connection with the spotlight bracket. The chief advantages are derived from having the spotlight within easy reach of the driver, in either an enclosed or open car, when curtains are fastened or car is equipped with windshield wings.

The bracket goes through the windshield, and the light is moved on a ball-and-socket joint that is held in place by highly polished aluminum castings. A layer of cork next to the glass on each side makes a better fit against the glass, and also makes a waterproof joining. One bracket fits any make of car. The switch and handle are less than five inches from the steering wheel. Special arrangement of the outside-casting and equipment with a three-foot cord make the light easily converted into a trouble light.

The company manufactures a special glass cutter that fits any drill press, such as is had by all modern service stations. This cutter sells at \$2.50 to the service man or dealer, and will cut 60 holes without sharpening. Price \$15. Floyd Clymer Mfg. Co., 1336 Broadway, Denver, Colo.

### BRINCK CARRIER AND STEP PLATE SCRAPER

This is constructed of polished aluminum;  $1\frac{1}{4}$  in. web straps hold the luggage tight to the running board. The carrier is bolted permanently in place, cannot be stolen, and will hold luggage of any kind or shape. When not used as a carrier, the scraper is let down to protect the runningboard from wear. Price \$7.50. Brinck Mfg. Co., Moline, Ill.

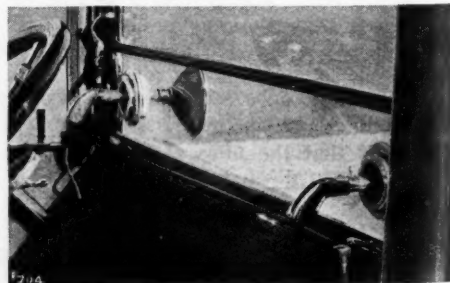


Fig. 5—Clymer spotlight operates through windshield



# Service Equipment

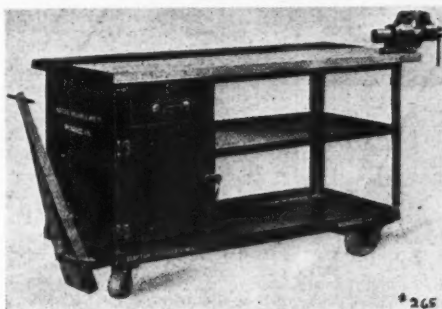
## Time Savers for the Shop

### BLACK & DECKER SAFETY CLEANING MACHINE

The safety cleaning machine consists of a cast iron pedestal with a bowl at the top, 13 in. in diameter and about 12 in. deep. About 5 in. from the bottom of the bowl a fine mesh brass screen is supported. A plunger pump is cast integral with the bowl at one side. The bowl is provided with a safety cover, arranged so that it cannot be left open. This cover is controlled by a convenient handle which operates the plunger pump when the cover is lifted. A gallon of gasoline, kerosene or such liquid cleanser as it is desired to use, is poured into the bowl of the machine and the operation of the plunger pump forces a stream of this fluid from one side into the center of the bowl. It passes through the screen and returns to the sump so that liquid is used over and over again. Holding the part to be cleaned under the stream of cleaning liquid washes dirt, chips and foreign matter from the part to be cleaned and deposits it on the screen below. Price, \$56. Black & Decker Mfg. Co., Baltimore, Md.

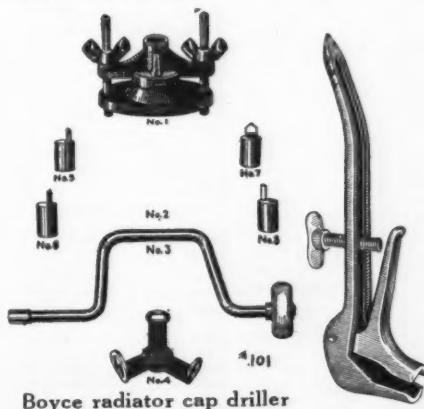


Black & Decker cleaning machine



Portable shop bench

ning to the automatic control switch. It also acts as a pressure release, preventing the starting of the motor against high pressure in the tank. Shipping weight, 320 lbs. Prices range from \$192 to \$225. Franklin Air Compressor Co., Norristown, Pa.



Boyce radiator cap driller

Above—101 wrench

Left—Parker grinding, drilling and turning machine

### PARKER GRINDING, DRILLING AND TURNING MACHINE

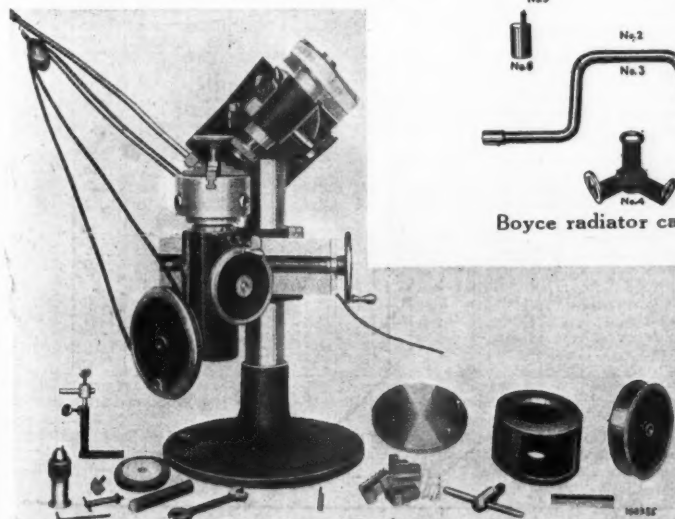
This is a well-designed and accurately constructed small machine tool. It is a portable machine shop in that the following operations can be performed on the one machine—grinding valve seat reamers, refacing valves, grinding push rods, valve cages, commutators, gears, etc.; sharpening milling cutters, drilling and re boring pistons and a large variety of small machine operations. Specifications: height of machine, 24 in.; weight, 125 lbs.; horizontal travel of lower spindle, 2 3/8 in. (graduated in thousandths); travel of upper spindle, 1 1/2 in.; vertical adjustment, 8 3/4 in.; 4-in. three-jaw universal, with two sets of jaws; upper spindle bearing, special design ball bearing; motor 1/4 hp. AC. or DC. to run from lighting circuit. Parker grinding, drilling and turning machine with complete equipment, as shown, \$245, f.o.b. Detroit. Ex-Cell-O Tool & Mfg. Co., 1214 Beaubien street, Detroit.

### PORTABLE SHOP BENCH

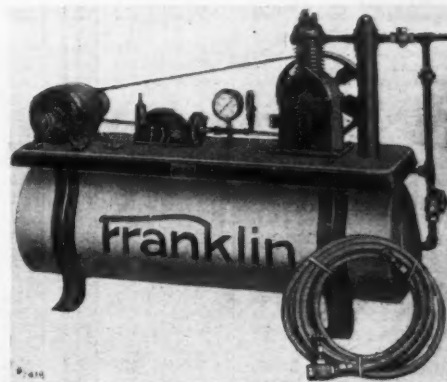
Bringing all the necessary tools to the job eliminates running back and forth, and effects a considerable saving in the time required to complete a repair job. This portable shop bench is strongly built. Its dimensions are 24 in. by 60 in. by 34 in. high, and it is fitted with a heavy hardwood top and a steel tray extending its full length. A vise can be attached. The drawers and compartments are equipped for locking. Folding the handle against the end makes the bench immovable. Weight 285 lbs. Welded Products Mfg. Co., Milwaukee.

### 101 WRENCH

This is a many-purpose wrench; it can be used as a socket wrench, set of S wrenches, monkey wrench, pipe wrench and tire tool, it is claimed. Price \$2.50. Hutton & Hutton, 127 Spring St., Springfield, Mass.



Franklin air compressor





## Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ambassador.....R	Cont.	6-3 1/2 x 5 1/4	136	33x5	14500	14500	14500	14500	14500
American.....C	H-S.	6-3 1/2 x 5	127	32x4	12195	12195	12195	12195	12195
Anderson.....Series 40	Cont.	6-3 1/2 x 5 1/4	120	33x4	1650	1650	1650	1650	1650
Apperson.....8-21-S	Own.	8-3 1/2 x 5	130	34x4 1/2	3000	3250	4500	4500	4500
Apperson.....Anniversary	Own.	8-3 1/2 x 5	130	34x4 1/2	3500	3750	4750	4750	4750
Auburn.....6-51	Cont.	6-3 1/2 x 4 1/2	121	32x4	1670	1695	1700	2475	2495
Beggs.....20T	Cont.	6-3 1/2 x 4 1/2	120	33x4	1775	1520	2320	2420	2420
Bell.....4-32	H-S.	4-3 1/2 x 5	114	31x4	1495	1495	1495	1495	1495
Bell.....6-50	H-S.	6-3 1/2 x 5	124	32x4	1695	1695	1695	1695	1695
Biddle.....B1 & B5	Buda.	4-3 1/2 x 5 1/4	121	32x4	3475	3475	4750	4750	4750
Birch Super-Four.....	H-S.	4-3 1/2 x 5	117	33x4	1195	1195	1245	1795	1795
Birch Light Four.....	Leit.	4-3 1/2 x 5 1/4	108	30x3 1/2	995	995	995	995	995
Birch Light Six.....	H-S.	6-3 1/2 x 5	117	33x4	1395	1395	1445	1995	1995
Bour-Davis.....215	Cont.	6-3 1/2 x 5 1/4	126	33x4 1/2	2385	2385	2385	2385	2385
Brewster.....91	Own.	4-3 1/2 x 5	125	32x4 1/2	1700	700	1050	1050	1050
Buick.....1922-31-35-37	Own.	4-3 1/2 x 5 1/4	109	31x4	935	975	1475	1650	1650
Buick.....1922-44-5-6-7	Own.	6-3 1/2 x 5	118	33x4 1/2	1495	1525	2135	2435	2435
Buick.....1922-48-9-50	Own.	6-3 1/2 x 5 1/4	124	34x4 1/2	1995	1735	2325	2635	2635
Bush.....E.C.A.	Lye.	4-3 1/2 x 5	116	33x4	1195	1195	1195	1195	1195
Bush.....E.C.E.	Itut.	6-3 1/2 x 5	116	33x4	1345	1345	1750	1850	1850
Cadillac.....61	Own.	8-3 1/2 x 5 1/4	132	33x5	3790	3790	3940	4690	4950
Case.....V	Own.	6-3 1/2 x 5 1/4	126	34x4 1/2	2250	2250	2900	3285	3285
Chalmers.....6-30	Own.	6-3 1/2 x 5 1/4	117	32x4	1245	1295	1995	2295	2295
Chalmers.....6-30	Own.	6-3 1/2 x 5 1/4	122	33x4 1/2	1295	1395	1995	2295	2295
Champion.....Tourist	Lye.	4-3 1/2 x 5	113	32x3 1/2	995	995	1050	1050	1050
Champion.....Special	H-S.	4-3 1/2 x 5	118	32x4	1295	1295	1295	1295	1295
Chandler.....Six	Own.	6-3 1/2 x 5	123	33x4	1785	1785	2785	2885	2885
Chevrolet.....490	Own.	4-3 1/2 x 4	102	30x3 1/2	525	525	875	875	875
Chevrolet.....490	Own.	4-3 1/2 x 4	110	32x4	975	975	1575	1575	1575
Chevrolet.....490	Own.	6-3 1/2 x 4 1/2	112	32x4	1295	1295	2195	2295	2295
Cleveland.....40	Own.	6-3 1/2 x 5	115	33x4	1385	1385	1385	1385	1385
Climber Four.....K	H-S.	4-3 1/2 x 5	125 1/2	32x4 1/2	2250	2250	3000	3100	3100
Climber Six.....S	H-S.	6-3 1/2 x 5	127	33x5	2485	2485	3385	3685	3685
Cole.....870	North.	8-3 1/2 x 5 1/4	127	33x5	2485	2485	3385	3685	3685
Columbia Challenger.....	Itut.	6-3 1/2 x 5	115	32x4	1195	1195	1995	1995	1995
Columbia.....D-C&S	Cont.	6-3 1/2 x 5 1/4	125	32x4	1475	1475	2295	2350	2350
Comet.....C-53	Cont.	6-3 1/2 x 5 1/4	126	33x4 1/2	2350	2350	3650	3650	3650
Commonwealth.....44	H-S.	4-3 1/2 x 5	117	32x4	1305	1305	2465	2465	2465
Crawford.....21-6-10	Cont.	6-3 1/2 x 5 1/4	122 1/2	32x4	3000	3000	3000	3000	3000
Crow-Elkhart.....163-65	Lye.	6-3 1/2 x 5	117	32x3 1/2	1295	1295	1295	1295	1295
Crow-Elkhart.....563-65	H-S.	6-3 1/2 x 5	117	33x4	1545	1545	1545	1545	1545
Daniels.....D-19	Own.	8-3 1/2 x 5 1/4	132	34x4 1/2	15350	15350	6250	6950	6950
Davis.....61-67	Cont.	6-3 1/2 x 4 1/2	120	32x4	1895	1695	2050	2595	2595
Dixie Flyer.....H-S-70	Own.	4-3 1/2 x 5	112	32x4	1315	1315	1995	1995	1995
Dodge Brothers.....	Own.	4-3 1/2 x 5 1/4	114	32x4	935	985	5890	6290	6290
Dorris.....6-80	Own.	4-3 1/2 x 5	108	31x4	985	985	1685	1685	1685
Dort.....17-12	D-Ly.	4-3 1/2 x 5	104	30x3 1/2	1275	1275	1975	1975	1975
Driggs.....	Own.	4-3 1/2 x 5 1/4	124	32x4 1/2	3400	3400	4900	4900	4900
Du Pont.....A	Cont.	4-3 1/2 x 5 1/4	109	31x4	890	890	1365	1365	1365
Durand.....A-22	Cont.	4-3 1/2 x 5 1/4	109	31x4	890	890	1365	1365	1365
Earl.....4-40	Own.	4-3 1/2 x 5 1/4	112	32x4	1375	1285	1995	1995	1995
Elcar.....K-4	Lye.	4-3 1/2 x 5	117	33x4	1145	1145	1545	1645	1645
Elcar.....7-R	Cont.	6-3 1/2 x 4 1/2	117	33x4	1595	1595	2395	2495	2495
Elgin.....K-1	Falls.	6-3 1/2 x 4 1/2	118	33x4	1595	1595	2395	2395	2395
Essex.....	Own.	4-3 1/2 x 5	108 1/2	32x4	1195	1195	1395	1395	1395
Fergus.....S-5-21	Own.	6-3 1/2 x 5	126	33x4 1/2	2095	2095	2995	2995	2995
Ferris.....C-20	Cont.	6-3 1/2 x 5 1/4	130	32x4 1/2	3225	3225	3995	3995	3995
Ford.....9-B	Own.	6-3 1/2 x 4	115	32x4	2300	2350	2650	3350	3350
Franklin.....	Own.	6-3 1/2 x 4	115	32x4	2300	2350	2650	3350	3350
Gardner.....T-R & G	Lye.	4-3 1/2 x 5	112	32x3 1/2	1095	1095	1695	1695	1695
Grant.....Six	Own.	6-3 1/2 x 4 1/2	116	32x4	1550	1550	2450	2450	2450
H.C.S.....	Own.	4-3 1/2 x 5 1/4	120	32x4 1/2	2725	2725	3450	3650	3650
Halladay, Manh. Special	Itut.	6-3 1/2 x 5	118	33x4	1595	1595	1595	1595	1595
Halladay, Craft Special	Itut.	6-3 1/2 x 5	123	33x4	2195	2195	2195	2195	2195
Handley-Knight.....	Knht.	4-4 1/2 x 5 1/4	125	32x4 1/2	1700	2850	4185	4185	4185
Hanson Six.....60	Cont.	6-3 1/2 x 4 1/2	121	32x4	1700	1995	2775	2885	2885
Hatfield.....A-42	H-S.	4-3 1/2 x 5	115	32x4	1495	1495	2395	2395	2395
Haynes.....75	Own.	6-3 1/2 x 5 1/4	132	34x4 1/2	2685	2485	3185	3185	3185
Haynes.....55	Own.	6-3 1/2 x 5	121	33x4	1835	1785	2835	2835	2835
Haynes.....48	Own.	12-2 1/2 x 5	132	34x4 1/2	4200	3635	4950	4950	4950
Holmes.....Series 4	Own.	6-3 1/2 x 5	126	34x4 1/2	2050	2050	3850	4150	4150
Hudson Super 6.....	Own.	6-3 1/2 x 5	126	34x4 1/2	1895	1895	2770	2895	2895
Huffman.....R	Cont.	6-3 1/2 x 4 1/2	120	32x4	1845	1795	2795	2795	2795
Hupmobile.....Series R	Own.	4-3 1/2 x 5 1/2	112	32x4	1250	1250	2100	2150	2150
Jackson.....638	Cont.	6-3 1/2 x 4 1/2	121	32x4 1/2	2285	1635	2985	2985	2985
Jordan.....MX	Cont.	6-3 1/2 x 4 1/2	120	32x4	2095	2095	3200	3200	3200
Jordan.....F	Cont.	6-3 1/2 x 5 1/4	127	32x4 1/2	2475	2475	3500	3500	3500
Kenworthy.....8-90	Own.	8-3 1/2 x 5 1/4	130	32x4 1/2	5000	5000	6000	6000	6000
Kessler.....K	Own.	4-3 1/2 x 3 1/2	117	32x4	1995	1995	2445	2445	2445
King 8.....J	Own.	8-3 1/2 x 5	120	32x4 1/2	2140	2125	3125	3235	3235
Kissel.....45	Own.	6-3 1/2 x 5 1/2	124	32x4 1/2	2975	2975	3775	3775	3775
Kline Kar.....6-55-K	Cont.	6-3 1/2 x 4	121	33x4	2090	2090	3250	3290	3290
Kurtz Automatic.....A	H-S.	6-3 1/2 x 5	122	32x4	2050	2050	3000	3000	3000
LaFayette.....134	Own.	8-3 1/2 x 5 1/4	132	33x5	4850	4850	6250	6500	6500
Leach.....999	Own.	6-3 1/2 x 5 1/4	134	32x4 1/2	6500	6500	6500	6500	6500
Lexington.....Series S	Cont.	6-3 1/2 x 4 1/2	122	32x4	1885	1885	2750	3150	3150
Lexington.....Series T	Anst.	6-3 1/2 x 4 1/2	128	32x4 1/2	2785	2785	3750	3750	3750
Liberty.....10-C	Own.	6-3 1/2 x 5	117	32x4	1595	1595	2400	2495	2495
Lincoln.....	Own.	8-3 1/2 x 5	136	33x5	4300	4600	4950	5400	5400
Locomobile.....	Own.	6-4 1/2 x 5 1/2	142	35x5	7600	7600	10500	11000	11000
McBroom.....B	Falls.	6-3 1/2 x 4 1/2	116	32x4	1395	1395	2295	2295	2295
Marmont.....34	Own.	6-3 1/2 x 5 1/2	136	32x4 1/2	4185	3985	4875	5275	5275
Maxwell.....25	Own.	4-3 1/2 x 4 1/2	109	31x4	885	885	1385	1485	1485
McFarlan.....1921	Own.	6-4 1/2 x 6	140	33x5	6300	6300	7500	7500	7500
Mercer.....Series 5	Own.	4-3 1/2 x 6 1/4	132	32x4 1/2	3950	3950	4850	4850	4850
Merit.....	Cont.	6-3 1/2 x 4 1/2	119	32x4	1985	1985	1985	1985	1985
Meteor.....R & RR	Dues.	4-4 1/2 x 6	129	32x4 1/2	5500	5500	5500	5500	5500
Metz.....M6	Rut.	6-3 1/2 x 5	120	32x4	1995	1995	2795	2895	2895
Mitchell.....F-40	Own.	6-3 1/2 x 5	120	32x4	1790	1790	1790	1790	1790
Mitchell.....F-40	Own.	6-3 1/2 x 5	120	33x4	11490	11490	11490	11490	11490
Mitchell.....F-42	Own.	6-3 1/2 x 5	127	33x4	1795	1795	1795	1795	1795
Mitchell.....F-45	Own.	6-3 1/2 x 5	120	33x4	11490	11490	11490	11490	11490
Moller.....A	Own.	4-2 1/2 x 4	100	27x3 1/2	2000	2000	2000	2000	2000
Monroe.....S-9 & 10	Own.	4-3 1/2 x 4 1/2	115	32x3 1/2	1285	1295	1295	1295	1295
Monroe.....S-11 & 12	Own.	4-3 1/2 x 4 1/2	115	33x4	1785	1785	2285	2785	2785
Moon.....6-48	Cont.	6-3 1/2 x 4 1/2	122	32x4	1785	1785	2285	2785	2785
Moon.....6-68	Cont.	6-3 1/2 x 5 1/4	125	32x4 1/2	2285	2285	2285	2285	2285
Murray-Mac Six.....	Own.	6-3 1/2 x 5 1/4	128	34x4	4250	4250	4250	4250	4250
Nash.....681-7	Own.	6-3 1/2 x 5	121	33x4	1525	1545	1695	2395	2695
Nash.....682	Own.	6-3 1/2 x 5	127	34x4 1/2	1695	1695	1695	1695	1695
Nash Four.....41-4	Own.	4-3 1/2 x 5	112	33x4	1025	1045	1645	1835	1835
National Sixlet.....BB	Own.	6-3 1/2 x 5 1/4	130	32x4 1/2	2990	2990	4140	4240	4240
Noma.....	Cont.	6-3 1/2 x 4 1/2	128	32x4 1/2	2800	2850	3200	3700	3700
Norwalk.....430-KS	Lye.	4-3 1/2 x 5	116	32x3 1/2	1035	1035	1035	1035	1035
Oakland.....34-D	Own.	6-2 1/2 x 4 1/4	115	32x4	1095	1145	1265	1625	1725
Ogren.....G-T	Cont.	6-3 1/2 x 5 1/4	134	33x5	4450	4250	5200	5500	5500
Oldsmobile.....43-A	Own.	4-3 1/2 x 5 1/4	115	32x4	1145	1145	1645	1845	1845



## Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive			
				Front	Rear					Front	Rear					Front	Rear			
Acason	1	\$1050	3 1/2 x 5	34x5 1/2	31x5 1/2	W	Corbitt, H	1	\$1800	3 1/2 x 5	35x5 1/2	35x5 1/2	B	Garford, 77D	3 1/2	\$4300	4 1/2 x 6	36x5	36x6d	W
Acason, R	1 1/2	2260	3 1/2 x 5 1/2	36x5 1/2	36x5	W	Corbitt, E	1 1/2	2200	3 1/2 x 5	34x3 1/2	34x4	W	Garford, 68D	5	5200	5 x 6 1/2	36x6	40x6d	W
Acason, RB	1 1/2	2485	3 1/2 x 5 1/2	36x5 1/2	36x6	W	Corbitt, D	1 1/2	2600	3 1/2 x 5	36x3 1/2	36x5	W	Garford, 150-A	7 1/2	5500	5 1/2 x 6 1/2	36x6	40x7d	W
Acason, H	2 1/2	3295	4 1/2 x 5 1/2	36x4*	36x8*	W	Corbitt, C	2	3150	4 1/2 x 5 1/2	36x3 1/2	36x7	W	Gary, F	1	2100	3 1/2 x 5	36x3 1/2	36x4	W
Acason, L	3 1/2	4295	4 1/2 x 5 1/2	36x5*	36x10*	W	Corbitt, B	2 1/2	3300	4 1/2 x 5 1/2	36x4	36x7	W	Gary, I	1 1/2	2550	4 x 5 1/2	36x3 1/2	36x5	W
Acason, M	5	5250	5 x 6 1/2	36x6	40x12	W	Corbitt, A	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x10	W	Gary, J	2 1/2	3150	4 1/2 x 5 1/2	36x4	36x7	W
Ace, C	1 1/2	2295	3 1/2 x 5 1/2	34x3 1/2	31x5*	W	Corbitt, AA	5	5000	4 1/2 x 6	36x6	40x6d	W	Gary, K	3 1/2	4050	4 1/2 x 6	36x5	40x5d	W
Ace, A	2 1/2	2795	4 1/2 x 5 1/2	36x4*	36x7	W	Day-Elder, A	1	1600	3 1/2 x 5	34x3 1/2	34x4	W	Gary, M	5	5150	5 x 6 1/2	36x6	40x6d	W
Acme, G	1 1/2	2295	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Day-Elder, B	1 1/2	2000	3 1/2 x 5	34x3 1/2	34x5	W	Gersix, M	1 1/2	3100	4 x 5 1/2	36x3 1/2	36x7	W
Acme, B	1 1/2	2295	3 1/2 x 5	34x3 1/2	34x5	W	Day-Elder, C	2	2400	4 1/2 x 5 1/2	36x4	36x7	W	Gersix, K	2 1/2	3500	4 1/2 x 5 1/2	36x4	36x8	W
Acme, F	1 1/2	2295	3 1/2 x 5	34x3 1/2	34x5	W	Day-Elder, D	2 1/2	2750	4 1/2 x 5 1/2	36x4	36x7	W	Gersix	3 1/2	4500	4 1/2 x 6	36x5	40x12	W
Acme, AC	2 1/2	2295	4 1/2 x 5 1/2	36x4	36x7	W	Day-Elder, E	3 1/2	3150	4 1/2 x 5 1/2	36x5	36x5d	W	Golden West, GH	3	4500	4 1/2 x 6	36x7	36x7	W
Acme, C	3 1/2	2295	4 1/2 x 5 1/2	36x5	40x10	W	Dearborn, E	5	4250	4 1/2 x 6	36x5*	40x6d*	W	Golden West, G	3 1/2	5000	4 1/2 x 5 1/2	36x6	36x6	W
Acme, E	5 1/2	2295	4 1/2 x 5 1/2	36x6	40x12	W	Dearborn, FX	1 1/2	1700	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	W	Graham Bros. A	1 1/2	2495	3 1/2 x 5	36x5 1/2	36x6 1/2	W
Akr'n Multi-Trk20	1 1/2	1695	4 x 5 1/2	34x5	31x5	B	Dearborn, F	1 1/2	2300	3 1/2 x 5 1/2	34x4	31x5	W	Gramm-Bern, 10	1 1/2	1365	3 1/2 x 5	36x5 1/2	36x5 1/2	B
American, 25	2 1/2	3350	4 x 6	36x4*	36x4d*	W	Dearborn, 48	2 1/2	2180	3 1/2 x 5 1/2	34x4*	31x5*	W	Gramm-Bern, 15	1 1/2	2050	3 1/2 x 5	36x3 1/2	36x5*	I
American, 40	4	4275	4 x 6	36x5*	36x5d*	W	Defiance, G	1	1695	3 1/2 x 5	35x5 1/2	35x5 1/2	I	Gramm-Bern, 65	1 1/2	2725	3 1/2 x 5	36x3 1/2	36x5	W
Apex, G	1 1/2	1450	3 1/2 x 5	33x5 1/2	33x5 1/2	I	Defiance, D	1 1/2	2095	3 1/2 x 5	35x5 1/2	36x6	I	Gramm-Bern, 20	2 1/2	3175	4 1/2 x 5 1/2	36x4*	36x4*	W
Apex, D	1 1/2	1915	3 1/2 x 5 1/2	34x3 1/2	34x4	I	Defiance, E	2	2275	3 1/2 x 5	35x5 1/2	38x7	I	Gramm-Bern, 25	2 1/2	3575	4 1/2 x 5 1/2	36x5	40x5d*	W
Apex, E	2 1/2	2695	4 1/2 x 5 1/2	36x4	36x7	I	DeKalb, E2 1/2	2	2600	4 1/2 x 5 1/2	36x4*	36x6*	W	Gramm-Bern, 35	3 1/2	4375	4 1/2 x 5 1/2	36x6	40x6d*	W
Apex, F	3 1/2	3975	4 1/2 x 6	36x5	36x10	I	DeKalb, E2	2 1/2	2250	4 1/2 x 5 1/2	36x4*	36x5*	W	Hahn, J4	1	2200	4 x 5	35x5 1/2	35x5 1/2	W
Armleder, 20	1	1185	3 1/2 x 5	32x4 1/2	32x4 1/2	W	DeMartini, 1 1/2	1 1/2	2600	4 1/2 x 5 1/2	36x3 1/2	36x6	I	Hahn, CD	1 1/2	3000	4 1/2 x 5 1/2	36x5*	38x7*	W
Armleder, HW	2 1/2	2475	3 1/2 x 5	34x4*	36x7*	W	DeMartini, 2	2	3300	4 x 5 1/2	36x3 1/2	36x7	W	Hahn, EE	2 1/2	4000	4 1/2 x 5 1/2	36x4*	36x8*	W
Armleder, KW	3 1/2	3175	4 1/2 x 5 1/2	36x5	36x5d	W	DeMartini, 3	3	4250	4 1/2 x 5 1/2	36x4	36x10	W	Hahn, F	3 1/2	4500	4 1/2 x 5 1/2	36x5*	36x10*	W
Atco, B	1 1/2	2475	3 1/2 x 5	34x3 1/2	34x5	W	DeMartini, 4	4	4800	4 1/2 x 6	36x5	36x12	W	Hahn, EF	5	5000	4 1/2 x 6	36x6	40x12	W
Atco, B1	1 1/2	2475	3 1/2 x 5	34x3 1/2	34x5	W	Denby, 31	1 1/2	1625	3 1/2 x 5	35x5	35x5	B	Hal-Fur, E	1	2200	4 x 5	35x5 1/2	35x5 1/2	W
Atco, A	2 1/2	2475	3 1/2 x 5	34x3 1/2	34x5	W	Denby, 33	1 1/2	2300	3 1/2 x 5	35x5 1/2	38x7	I	Hal-Fur, B	2 1/2	3000	4 1/2 x 5 1/2	36x5*	38x7*	W
Atlas, M.D.	1 1/2	2475	3 1/2 x 5	34x3 1/2	34x5	W	Denby, 34	2	2600	3 1/2 x 5	36x3 1/2	36x6	I	Hal-Fur, F	3 1/2	4000	4 1/2 x 5 1/2	36x6*	40x10*	W
Atterbury, 20R	1 1/2	3175	4 1/2 x 5 1/2	36x4	36x4d	W	Denby, 25	3	3300	4 1/2 x 5 1/2	36x4	36x7	I	Hall, 1 1/2	1 1/2	3100	3 1/2 x 5	34x5	34x7	W
Atterbury, 7CX	2 1/2	3975	4 1/2 x 5 1/2	36x5	40x5d	W	Denby, 27	4	4200	4 1/2 x 5 1/2	36x5	36x5d	I	Hall, 2 1/2	2 1/2	3275	4 1/2 x 5 1/2	36x4	36x6	W
Atterbury, 7D	3 1/2	4175	4 1/2 x 5 1/2	36x5	40x5d	W	Denby, 210	5	4850	4 1/2 x 5 1/2	36x6	40x6d	I	Hall, 3 1/2	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x5d	W
Atterbury, 8E	5	4975	4 1/2 x 6	36x5	40x6d	W	Dependable, A	3 1/2	1650	3 1/2 x 5 1/2	34x5	36x6	W	Hall, 5	5	5100	4 1/2 x 5 1/2	36x5	40x6d	W
Autocar, 21UF	1 1/2-2	2400	3 1/2 x 5	34x4*	34x5*	D	Dependable, C	1 1/2	2350	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Hall, 7 chain	7	5100	4 1/2 x 5 1/2	36x5	40x6d	C
Autocar, 21UG	1 1/2-2	2400	3 1/2 x 5	34x4*	34x5*	D	Dependable, D	2	2650	4 x 5 1/2	36x4	36x6	W	Harvey, WEA	1 1/2	2550	4 1/2 x 5 1/2	34x3 1/2	34x5	W
Autocar, 26Y	1 1/2	4350	4 1/2 x 5 1/2	36x4	36x12	D	Dependable, E	2 1/2	2950	4 1/2 x 5 1/2	36x4	36x7	W	Harvey, WOA	2	2950	4 1/2 x 5 1/2	34x4	34x7	W
Autocar, 26-B	1 1/2	4500	4 1/2 x 5 1/2	36x4	36x12	D	Dependable, G	3 1/2	3550	4 1/2 x 5 1/2	36x4	36x7	W	Harvey, WFA	2 1/2	3300	4 1/2 x 5 1/2	36x4	36x7	W
Available, H1 1/2	1 1/2	2175	4 x 5 1/2	36x3 1/2	36x5*	W	Diamond T, OS	1	1975	3 1/2 x 5 1/2	34x5*	36x6*	W	Harvey, WHA	3 1/2	3950	4 1/2 x 5 1/2	36x5	36x5d	W
Available, H2	2 1/2	2775	4 x 5 1/2	36x3 1/2	36x6*	W	Diamond T, F	1 1/2	2525	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Harvey, WKA	5	4500	4 1/2 x 6	36x6	40x6d	W
Available, H2 1/2	2 1/2	3175	4 x 5 1/2	36x3 1/2	36x8*	W	Diamond T, T	1 1/2	2250	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Hawkeye, K	1 1/2	1850	3 1/2 x 5 1/2	34x3 1/2	34x5	I
Available, H3 1/2	3 1/2	4175	4 1/2 x 5 1/2	36x5	40x5d	W	Diamond T, U	2	2650	4 x 5 1/2	36x4	36x7	W	Hawkeye, M	2	2650	4 1/2 x 5 1/2	36x4*	36x6*	I
Available, H5	5	5375	4 1/2 x 6	36x6	40x12	B	Diamond T, V	3 1/2	3750	4 1/2 x 5 1/2	36x5	36x5d	W	Hawkeye, N	3 1/2	3700	4 1/2 x 5 1/2	36x5*	36x10*	I
Available, H7	7	6000	5 x 6	36x6	40x14	B	Diamond T, K	5	4325	4 1/2 x 5 1/2	36x6	40x6d	W	Hendrickson, M	2 1/2	3150	4 1/2 x 5 1/2	36x4*	36x7*	W
Avery	1	1185	3 x 4	34x5 1/2	34x5 1/2	I	Diamond T, S	5	4500	4 1/2 x 6	36x6	40x6d	W	Hendrickson, N	3 1/2	3075	4 1/2 x 5 1/2	36x5*	36x5d*	W
Beck, A Jr.	1	1950	3 1/2 x 5	34x3 1/2	31x4	I	Diehl, A	1	1185	3 1/2 x 5	31x4 1/2	35x5	I	Huffman, B	1 1/2	1905	3 1/2 x 5	34x3 1/2	34x6	I
Beck, C	2	2550	4 1/2 x 5 1/2	36x4	36x6	I	Diehl, B	1 1/2	1350	3 1/2 x 5	36x6	36x6	I	Huffman, C	1 1/2	1795	3 1/2 x 5	34x3 1/2	34x6	I
Beck, M	1 1/2	1495	3 1/2 x 5 1/2	35x5	35x5 1/2	W	Dispatch, F	1	4100	4 1/2 x 5 1/2	36x4*	36x6*	C	Hurlburt, A	1 1/2	2850	4 x 5 1/2	34x4	34x5	W
Beck, E	2 1/2	2100	4 1/2 x 5 1/2	34x4	34x6	W	Doane	2 1/2	5100	4 1/2 x 5 1/2	36x4	36x5d	C	Hurlburt, B	2 1/2	3750	4 1/2 x 5 1/2	36x5	36x4d	W
Belmont, D	2	2675	3 1/2 x 5	34x3 1/2	31x6*	D	Doane	6	6000	5 x 6 1/2	36x6	40x6d	C	Hurlburt, C	3 1/2	4590	4 1/2 x 6	36x5	36x5d	W
Belmont, F	3 1/2	3525	4 x 6	36x5*	36x5d*	D	Dodge Brothers	2 1/2	885	3 1/2 x 5 1/2	32x4 1/2	32x4 1/2	B	Hurlburt D	5	5500	4 1/2 x 6	36x5	40x6d	W
Bessemer, G	1	1395	3 1/2 x 5	35x5 1/2	35x5 1/2	I	Dorris, K-4	2-2 1/2	3400	4 1/2 x 5 1/2	36x4	36x7	W	Indep't (Iowa), E	1 1/2	1665	3 1/2 x 5	34x3 1/2	34x4	I
Bessemer, H-2	1 1/2	1995	3 1/2 x 5	36x3 1/2	36x5	I	Dorris, K-7	3 1/2	4400	4 1/2 x 5 1/2	36x5	36x10	W	Indep't (Iowa), G	1 1/2	2040	3 1/2 x 5	34x3 1/2	34x5	I
Bessemer, J-2	2 1/2	2595	4 1/2 x 5 1/2	36x4	36x4d	I	Double Drive B	3 1/2	4000	4 1/2 x 5 1/2	36x5	36x7	W	Indep't (Ia.), H, I	2 1/2	2940	4 1/2 x 5 1/2	34x4	34x6	I
Be semer, K-2	4	3195	4 1/2 x 5 1/2	36x5	36x10	I	Douglas I	1 1/2	1850	3 1/2 x 5 1/2	36x5	37x8*	W	Indep't (Ohio), F	1 1/2	2385	3 1/2 x 5	36x3 1/2	36x5	W
Big 4, H	3 1/2-4	5000	4 1/2 x 6	36x6	36x6	W	Duplex, A	1 1/2	2775	4 x 5 1/2	35x5 1/2	38x7	W	Indep't (Ohio), H	1 1/2	3085	4 1/2 x 5 1/2	36x4	36x4d	W
Big 4, T	4	5500	4 1/2 x 6	36x6	36x6	W	Duplex, E	3 1/2	4250	4 1/2 x 5 1/2	36x5	36x8	I	Indep't (Ohio), K	1 1/2	3985	4 1/2 x 5 1/2	36x5	36x5d	W
Big 4, K	7	6000	5 1/2 x 6	36x6	36x6	W	Duty, 21	2	1490	3 1/2 x 5	34x3 1/2	34x5	I	Indiana, 12	2 1/2	1745	3 1/2 x 5	34x3 1/2	34x5*	W
Big 4, HA	7	6000	5 1/2 x 6	36x6	36x6	W	Eagle, 100-2	2	2275	3 1/2 x 5 1/2	34x4*	34x7*	W	Indiana, 20						



## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Kelly-S, K-45	4	\$4550	4 1/2 x 6 1/2	36x5	40x6d	C	Norwalk, 35E Spec	1 1/2	\$2285	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Southern, 10	1	\$2090	3 1/2 x 5	34x3 1/2	34x4	W
Kelly-S, K-50	5	4900	4 1/2 x 6 1/2	36x6	40x6d	C	O. K., K1	1 1/2	2675	4 x 5 1/2	36x3 1/2	36x5	W	Southern, 15	1 1/2	2590	3 1/2 x 5 1/2	36x6 1/2	34x4	W
Kelly-S, K-60	6	5100	4 1/2 x 6 1/2	36x6	40x7d	C	O. K., L1	2 1/2	3450	4 1/2 x 5 1/2	36x4	36x8	W	Southern, 20	2	2990	4 1/2 x 5 1/2	36x6 1/2	40x8*	W
Keystone, 40	2	2450	3 1/2 x 5 1/2	34x5 1/2	38x7 1/2	I	O. K., M1	3 1/2	4250	4 1/2 x 6	36x5	36x5d	W	Standard, 1-K	1-1 1/2	1600	3 1/2 x 5	34x3 1/2	34x5*	W
Kimball, AB	2	3675	4 x 6	36x4	36x7	W	O. K., M1	3 1/2	4250	4 1/2 x 6	36x5	36x5d	W	Standard, 76	2 1/2-3	2400	4 1/2 x 5 1/2	36x4*	36x7*	W
Kimball, AC	2 1/2	3975	4 1/2 x 6	36x4	36x8	W	Ogden, A1	1 1/2	2375	3 1/2 x 5	36x3 1/2	36x5	W	Standard, 66	3 1/2-4	3150	4 1/2 x 5 1/2	36x5	36x10	W
Kimball, AK	3	4500	4 1/2 x 6	36x4	36x10	W	Ogden, E	2 1/2	2975	3 1/2 x 5 1/2	36x4	36x7	W	Standard, 5-K	5-7	4400	4 1/2 x 6	36x6	40x12	W
Kimball, AE	4	5000	5 x 6	36x6	40x12	W	Old Hickory, W	1 1/2	2175	3 1/2 x 5 1/2	36x3 1/2	36x7*	W	Sterling, 1 1/2	1 1/2	2885	4 x 5 1/2	36x3 1/2	36x5*	W
Kimball, AF	5	5800	5 x 6	36x6	40x7d	W	Old Reliable, A	1 1/2	2350	4 x 5	34x4	36x6	W	Sterling, 2	2	3085	4 x 5 1/2	36x4	36x6	W
Kissel, Express	1	1985 1/2	3 1/2 x 5 1/2	34x5 1/2	34x5 1/2	W	Old Reliable, B	1 1/2	3500	4 1/2 x 6	36x4	36x4d	W	Sterling, 2 1/2	2 1/2	3290	4 1/2 x 5 1/2	36x4*	36x4d*	W
Kissel, Utility	1 1/2	1975	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Old Reliable, C	1 1/2	4250	4 1/2 x 6	36x5	36x5d	W	Sterling, 3 1/2	3 1/2	4325	4 1/2 x 6 1/2	36x5*	40x5d*	W
Kissel, Freight	2 1/2	2875	4 1/2 x 5 1/2	36x4	36x7	W	Old Reliable, D	5	5250	4 1/2 x 6	36x6	40x6d	W	Sterling, 5-W	5	4050	5 x 6 1/2	36x6*	40x6d*	W
Kissel, H. D.	4	3675	4 1/2 x 5 1/2	36x5	36x5d	W	Old Reliable, E	7	6000	4 1/2 x 6 1/2	36x6	40x7d	C	Sterling, 5-C	5	5500	5 x 6 1/2	36x6	40x6d	C
Kleiber, AA	1	2600	4 1/2 x 5 1/2	34x3 1/2	34x5*	W	Old Reliable, KLM	1	1095	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	I	Sterling, 7 1/2	7 1/2	6000	5 x 6 1/2	36x6	40x7d	C
Kleiber, AB	1 1/2	3100	4 1/2 x 5 1/2	36x3 1/2	36x6*	W	Oldsmobile Econ.	2 1/2	3500	4 1/2 x 5 1/2	36x4	36x7	W	Stewart, 14	1 1/2	1395	3 1/2 x 5 1/2	32x4 1/2	32x4 1/2	I
Kleiber, BB	2	3600	4 1/2 x 5 1/2	36x4*	36x7*	W	Olympic, A	2 1/2	3800	4 1/2 x 5 1/2	36x4	36x7	W	Stewart, 15	1	1875	3 1/2 x 5	35x5 1/2	35x5 1/2	I
Kleiber, BC	2 1/2	3950	4 1/2 x 5 1/2	36x5*	36x8	W	Oshkosh, A	2	3750	3 1/2 x 5	36x6 1/2	36x6 1/2	4	Stewart, 9	1 1/2	2200	3 1/2 x 5	34x3 1/2	34x5	I
Kleiber, C	3 1/2	4600	4 1/2 x 5 1/2	36x5	36x5d	W	Oshkosh, B	2 1/2	4150	4 x 5 1/2	38x7	38x7 1/2	4	Stewart, 7	2	2800	4 1/2 x 5 1/2	34x4	34x7	I
Kleiber, D	5	5300	5 x 6 1/2	36x6	40x12	W	Oshkosh, BB	2 1/2	4300	4 x 5 1/2	38x7 1/2	38x7 1/2	4	Stewart, 7-X	2 1/2	2950	4 1/2 x 5 1/2	34x4	34x7	I
Koehler, D	1 1/2	1995	3 1/2 x 5	34x3 1/2	34x5	W	Packard, EC	1 1/2-3	3500	4 1/2 x 5 1/2	36x4	36x7	W	Stewart, 10	3 1/2	3850	4 1/2 x 5 1/2	36x5	36x5d	I
Koehler, M	2 1/2	3175	4 x 5 1/2	36x4	36x7	W	Packard, EX	1 1/2-3	4000	4 1/2 x 5 1/2	36x6 1/2	40x8 1/2	W	Stewart, 10-X	3 1/2	3850	4 1/2 x 5 1/2	36x5	36x5d	I
Koehler, MCS	2 1/2	3275	4 x 5 1/2	36x4	36x7	W	Packard, ED	2-4 1/2	4100	4 1/2 x 5 1/2	36x5	36x5d	W	Stoughton, A	1 1/2	1240	3 1/2 x 5	34x4 1/2	34x4 1/2	W
Koehler, F	3 1/2	4150	4 1/2 x 5 1/2	36x5	36x10	W	Packard, EF	4-7 1/2	4500	5 x 5 1/2	36x6	40x6d	W	Stoughton, B	1 1/2	1995	3 1/2 x 5 1/2	34x4 1/2	35x5 1/2	W
Koehler, MT, Trac	5	3275	4 x 5 1/2	36x4	36x7	W	Paige, 52-19	1 1/2	2880	4 x 5 1/2	34x3 1/2	34x5	W	Stoughton, D	2	2800	4 x 5 1/2	36x4	36x7	W
Lange, B	2 1/2	3350	4 1/2 x 5 1/2	36x4*	36x7*	C	Paige, 54-20	2 1/2	3400	4 1/2 x 5 1/2	34x4	34x8	W	Stoughton, F	3	3600	4 1/2 x 5 1/2	36x5d	36x5d	W
Larrabee, X-Z	3 1/2-1	1925	3 1/2 x 4 1/2	34x5 1/2	34x5 1/2	C	Paige, 51-18	2 1/2	4285	4 1/2 x 5 1/2	36x5	36x5d	W	Sullivan, E	2	3350	4 1/2 x 5 1/2	36x4*	36x7*	W
Larrabee, U	1 1/2	2400	3 1/2 x 5	34x3 1/2	34x5	W	Parker, F20	2	3500	4 x 6	34x4	36x4d	W	Sullivan, H	3 1/2	4650	4 1/2 x 6	36x5	36x5d	W
Larrabee, K	2 1/2	3200	4 1/2 x 5 1/2	36x4	36x7	W	Parker, J20	3 1/2	4400	4 1/2 x 5 1/2	36x5	40x5d	W	Superior, D	1	1650	3 1/2 x 5	34x4 1/2	34x4	I
Larrabee, L-4	3 1/2	4000	4 1/2 x 5 1/2	36x5	36x5d	W	Parker, M20	5	5500	4 1/2 x 6	36x6	40x6d	W	Superior, E	2	2600	4 1/2 x 5 1/2	36x4	36x6	I
Larrabee, W	5	4800	4 1/2 x 6	36x6	40x6d	W	Patriot, Revere	1	1500	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Super Truck, 50	2 1/2	3300	4 x 6	36x4	36x8	W
Luedinghaus, C	1	1695	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Patriot, Lincoln	2	2050	4 x 5 1/2	34x3 1/2	34x5	W	Super Truck, 70	3 1/2	4300	4 1/2 x 6	36x5	40x5d	W
Luedinghaus, W	1 1/2	2490	3 1/2 x 5 1/2	34x3 1/2	34x5*	W	Patriot, Washg'tn	3	2900	4 1/2 x 5 1/2	36x4	36x7	W	Super Truck, 100	5	5300	4 1/2 x 6	36x5	40x12	W
Luedinghaus, K	2-2 1/2	3150	4 1/2 x 5 1/2	36x4*	36x7*	W	Piedmont, 4-30	1	1200	3 1/2 x 5	34x4 1/2	34x4 1/2	W	Super Truck, 150	7 1/2	6300	5 x 6	36x6	40x7d	W
Maccar, L	1 1/2	2700	4 1/2 x 5 1/2	36x4	36x6	W	Pierce-Arrow	2	3200	4 x 5 1/2	36x4	36x4d	W	Texan, A38	3 1/2	1095	3 1/2 x 5	33x4	33x4	I
Maccar, H-A	2	3100	4 1/2 x 5 1/2	36x4	36x4d	W	Pierce-Arrow	3 1/2	4350	4 1/2 x 6 1/2	36x5	36x5d	W	Texan, TK39	1 1/2	1550	3 1/2 x 5	36x6	38x7	W
Maccar, H-2	3	3401	4 1/2 x 5 1/2	36x4	36x4d	W	Pioneer, 59	5	4850	4 1/2 x 6 1/2	36x5	40x6d	W	Tiffin, GW	1 1/2	2400	4 1/2 x 5 1/2	36x3 1/2	36x5	W
Maccar, M-2	4	4200	4 1/2 x 6	36x5	36x5d	W	Pittsburger, C-21	1	1550	3 1/2 x 4 1/2	32x4 1/2	32x4 1/2	W	Tiffin, MW	2 1/2	3100	4 1/2 x 5 1/2	36x4	36x3 1/2d	W
Maccar, G	5-6	4950	4 1/2 x 6	36x5	40x6d	W	Power, F	3	3800	4 1/2 x 5 1/2	36x5*	36x7*	W	Tiffin, PW	3 1/2	4100	4 1/2 x 5 1/2	36x5	40x5d	W
MacDonald, A	7 1/2	5750	4 1/2 x 6	40x7	40x14	I	Power, C	3 1/2	3400	4 1/2 x 5 1/2	36x6	36x6	W	Tiffin, F50	5	4800	4 1/2 x 6	36x6	40x6d	W
Mack, AB D.R.	1 1/2	3150	4 x 5	36x4	36x3 1/2d	D	Premcar, B-143	1 1/2	2475	3 1/2 x 5	36x6 1/2	36x6 1/2	W	Tiffin, F60	6	5000	4 1/2 x 6	36x6	40x12	W
Mack, AB	2 1/2	3400	4 x 5	36x4	36x4d	C	Rainier, R-21	1 1/2	1990	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Titan, HT	3 1/2	4550	4 1/2 x 6	36x4*	40x5d	I
Mack, AB Chain	1 1/2	3000	4 x 5	36x4	36x3 1/2d	C	Rainier, R-19	3 1/2	2150	3 1/2 x 5	34x3 1/2	34x5	W	Titan, HD	5	5400	4 1/2 x 6	36x5	40x6d	I
Mack, AB Chain	2	3300	4 x 5	36x4	36x4d	C	Rainier, R-16	1 1/2	2490	3 1/2 x 5	34x3 1/2	34x5	W	Titan, TS	2 1/2	3400	4 1/2 x 5 1/2	36x4*	36x4d	I
Mack, AB D.R.	2	3750	4 x 5	36x4	36x4d	D	Rainier, R-18	2 1/2	2890	3 1/2 x 5 1/2	34x4	34x6	W	Tower, J	1 1/2	2900	4 1/2 x 5 1/2	35x5	38x7	W
Mack, AC Chain	3 1/2	4950	5 x 6	36x5	40x5d	C	Rainier, R-20	2 1/2	3550	4 1/2 x 5 1/2	34x4	34x7	W	Tower, H	2 1/2	3200	4 1/2 x 5 1/2	36x4	36x7	W
Mack, AC Chain	5	5500	5 x 6	36x6	40x6d	C	Rainier, R-15	2 1/2	4400	4 1/2 x 5 1/2	36x5	36x5d	W	Tower, G	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x5d	W
Mack, AC Chain	6 1/2	5750	5 x 6	36x6	40x12	C	Rainier, R-20	2 1/2	4400	4 1/2 x 5 1/2	36x5	36x5d	W	Traffic, C	...	1595	3 1/2 x 5	34x3 1/2</		



## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive			
				Front	Rear						Front	Rear						Front	Rear				
Ward-LaF., 4A	3½	\$4690	4½x6½	36x5	36x5d	W	Wichita, RX	2½	\$3600	4½x6	36x4*	36x8*	W	Winther, 751	1	\$1795	3½x5	34x4½	35x5½	I			
Ward-LaF., 5A	5	5590	5 x6½	36x6	40x6d	W	Wichita, O	3½	4000	4½x6	36x5*	36x5d*	W	Winther, 430	1½	2850	3½x5	32x4	32x4	I			
Watson, E	1	1895	3½x5½	35x5½	35x5½	W	Wichita, S	6	5000	4½x6	36x6	40x6d	W	Winther, 39	1½	2450	3½x5	34x3½	34x5	I			
Watson, N	1½	2550	4½x6½	36x5	36x10	W	Wilcox, AA	1	1900	3½x5½	36x4*	36x4*	W	Winther, 49	2	3250	4 x5	34x4	34x4d	I			
Western, W1½	1½	2550	4½x6½	36x3½*	36x5*	W	Wilcox, BB	1½	2550	4½x6	36x4	36x5	W	Winther, 50	2½	3995	4 x5	38x7½	42x9½	I			
Western, L1½	1½	2550	3½x5½	36x3½*	36x5*	W	Wilcox, D	2½	3000	4½x6	36x4*	36x3½d*	W	Winther, 70	3½	4200	4 x6	36x5	36x5d	I			
Western, W2½	2½	3250	4½x6½	36x4	36x7	W	Wilcox, E	3	3950	4½x6	36x5*	36x5d*	W	Winther, 450	5	3690	4 x5	34x5	36x6	I			
Western, L2½	2½	3250	4½x6	36x4	36x7	W	Wilcox, F	5	4350	4½x6½	36x5	40x6d	W	Winther, 109	5	5250	4½x6	36x6	40x5d	I			
Western, W3½	3½	4250	4½x6	36x5	40x5d	W	Wilson, F	1½	2270	3½x5½	36x3½	36x5	W	Winther, 140	7	5900	5 x6	36x6	40x7d	I			
White, 15	3	2400	3½x5½	34x5½	34x5½	B	Wilson, EA	2½	2825	4½x5½	36x4	36x7	W	Wisconsin, B	1	1950	4 x5½	34x5½	34x5½	W			
White, 20	2	3250	3½x5½	36x4*	36x7	D	Wilson, G	3	3685	4½x5½	36x5	36x5d	W	Wisconsin, C	1½	2500	4½x5½	36x6	36x10	W			
White, 40	3½	4200	3½x5½	36x5	40x5d	D	Wilson, H	5	4520	4½x6	36x6	40x6d	W	Wisconsin, D	2½	3500	4½x6½	36x6	36x10	W			
White, 45	5	4500	4½x5½	36x6	40x6d	D							Wisconsin, E	3½	4000	5 x6½	36x6	36x12½	W				
White Hick., E	1	1225	3½x5½	34x5½	34x5½	W	*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl.										Witt-Will, N	1½	2750	3½x5	36x3½*	36x5*	W
White Hick., H	1½	1375	3½x5½	36x3½	36x5	W	Trac. Tractor. **Canadian made.										Witt-Will, P	2½	3250	4½x5½	36x3½*	36x5*	W
White Hick., K	2½	1675	4½x5½	36x4	36x5	W	Final Drive: W—Worm, I—Internal Gear, C—Chains, D—										Wolverine, J	1	2125	3½x5	34x3	34x4	W
Wichita, K	1	2300	3½x5½	36x3*	36x4*	W	Double Reduction, B—Bevel, 4—Four-Wheel, E—External										Wolverine, J	1½	2375	3½x5	34x3½	34x5	I
Wichita, L	1½	2600	3½x5½	36x3½*	36x5*	W	Gear. †Tires—optional. ‡Pneumatic Tires. All others solid.										Wolverine, J	2	2640	3½x5	34x4	34x7	I
Wichita, M	2	2800	3½x5½	36x3½*	36x6*	W	†Price includes body. ‡Price includes several items of										Wolverine, J	2½	3425	4½x5½	36x5	36x10	I
Wichita, R	2½	3000	3½x5½	36x4*	36x7*	W	equipment.										Wolverine, L	3½	4100	4½x5½	36x5	36x10	I

## Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
All-In One.....	16-30	\$1975	3	Clim.	4-5 x6½	GDK	3-4	Grain Belt...A	18-36	\$2150	4	Wauk.	4-4½x6½	G or K	4	Port Huron...A	12-25	\$1600	4	Chief	4-3½x6	G,K	3
Allis-Chalm. B	6-12	925	2	LeR.	4-3½x4½	Gas.	1	Gray.....1920	18-36	2000	3	Wauk.	4-4½x6½	Gas.	4	Prairie Dog...L	9-18	650	3	Wauk.	4-3½x5½	Gas.	2
Allis-Chalm. G.P	6-12	795	2	LeR.	4-3½x4½	Gas.	1-2	Ground Hog...	19-31	2000	4	Erd.	4-4 x8	G or K	3	Prairie Dog...D	15-30	1250	4	Wauk.	4-4½x6½	Gas.	3
Allis-Chalm. ....C	12-20	1350	2	Midw.	4-4½x5½	Gas.	2-3	Gt. Western St.	20-30	1950	4	Beav.	4-4½x6	K	4	Ranger Cul. T-20	8-16	.....	4	LeR.	4-3½x4½	Gas.	1
Allis-Chalm. ....18-30	2150	4	Own	4-4½x6½	G,K	3-4	Hart-Parr...29	20	945	4	Own	2-5½x6½	K,D	2	Reed.....A-1	15-30	1985	4	Wauk.	4-4½x6½	G or K	3-4	
Allis-Chalm. ....10-18	875	4	Own	4-4½x6½	G,K	3	Hart-Parr...30	30	1295	4	Own	2-6½x7	K,D	3	Reliable.....	18-36	2185	4	Wauk.	4-5 x6½	Gas.	4	
Allwork...2-G	14-28	1775	4	Own	4-4½x6½	G or K	3	Heider.....D	9-16	1170	4	Wauk.	4-4½x6½	G,K	2	Rex.....	10-20	885	4	Wauk.	2-6 x7	Ker.	2
Allwork...C	14-28	1525	4	Own	4-5 x6	G or K	3	Heider.....C	12-20	1395	4	Wauk.	4-4½x6½	G,K	3	Russell.....	12-25	1600	4	Wauk.	4-4½x5½	G or K	3
Andrews-Kin.D	18-36	2500	4	Clim.	4-5 x6½	G or K	4	Heider...Cult	6-10	1050	4	LeR.	4-3½x4½	G or K	1	Russell.....	12-24	1500	4	Wauk.	4-4½x5½	G or K	2-3
Appleton.....	12-20	1500	4	Buda	4-4½x5½	G,K	2-3	Hicks.....	20-30	.....	4	...	4-4½x6	K or G	4	Russell.....	15-30	2200	4	Wauk.	4-5 x6½	G or K	3-4
ARO, 1921-22	3-5	495	4	Own	1-4½x5	Gas.	1	Huber Light 4	12-25	1185	4	Wauk.	4-4½x6½	G or K	3	Russell.....	20-35	3000	4	Wauk.	4-5½x6	G or K	4-5
Aultman-T...	15-30	2200	4	Clim.	4-5 x6½	G,K	6	Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas	3	Russell.....	30-60	5000	4	Wauk.	4-8 x10	G or K	8-10
Aultman-T...	22-45	3420	4	Own	4-5½x8	G,K	6	Illinois Super Drive...C	18-30	.....	4	Clim.	4-5 x6½	G,K	4	Samson...M	10-20	.....	4	Nor	4-4 x5½	G,K	2
Aultman-T...	30-60	4500	4	Own	4-7 x9	G,K,D	8	Imperial...E	40-70	4500	4	Own	4-7½x9	G,K,D	10	Sandusky...J	15-35	1750	4	Wauk.	4-4½x5½	G,K,D	2
Automot. B-3	12-24	1785	4	Here.	4-4 x5	Gas.	2-3	Indians...F	5-10	895	2	LeR.	4-3½x4½	Gas.	1-2	Shawnee Com.	6-12	.....	2	LeR.	4-3½x4½	Gas.	1
Avery, SR, Cul.	5-10	.....	4	Own	4-3 x4	G,K	...	International...	8-16	900	4	Own	4-4½x5	G,K,D	2	Shawnee Com.	9-18	.....	2	Gray	4-3½x5	Gas.	1
Avery...Cult-C	...	...	3	Own	6-3 x4	G,K	2	International...	15-30	1750	4	Own	5½x8	G,K,D	2	Shelby...D	15-30	.....	4	Beav.	4-4½x6	G,K	3
Avery...B	5-10	.....	4	Own	6-3 x4	G,K	2	J-T...N	20-40	.....	2	Chief.	4-4½x6	G,K,D	3-4	Shelby...C	10-20	.....	4	Erd.	4-4 x6	G or K	2-3
Avery...C	8-16	.....	4	Own	2-5½x6½	G,K,D	2-3	Knudsen...F	16-32	1475	4	Clim.	4-4½x6½	G or K	3-4	Short Turn...	20-40	1500	3	Beav.	4-4½x6	G,K	3
Avery...C	12-20	.....	4	Own	2-5½x6½	G,K,D	2-3	Knudsen...F	25-45	2500	4	Own	4-5 x9	Gas	4-6	Steady Pull...	12-24	1485	4	Wauk.	4-4 x5	Gas.	3
Avery...C	12-25	.....	4	Own	2-6½x7	G,K,D	3-4	LaCrosse...M	6-12	650	4	Own	2-4 x6	G,K	1	Stinson...4E	18-36	1835	4	Beav.	4-4½x6	G,K	4
Avery...C	14-28	.....	4	Own	4-4½x7	G,K,D	4-5	LaCrosse...G	12-24	985	4	Own	2-6 x7	G or K	3	Stone...	20-40	2250	4	Beav.	4-4½x6	G,K	4
Avery...C	18-36	.....	4	Own	4-5½x8	G,K,D	4-5	LaCrosse...G	12-24	985	4	Own	2-6 x7	G or K	3	Tioga.....3	15-27	2625	4	Wisc.	4-4½x6	Gas.	3-4
Avery...C	25-50	.....	4	Own	4-6½x7	G,K,D	5-6	Lausen...5	12-25	1495	4	Midw.	4-4½x5½	Gas.	3	Titan...	10-20	900	4	Wauk.	2-6½x8	G,K,D	3
Avery...C	45-65	.....	4	Own	4-7½x8	G,K,D	8-10	Lausen...20	15-25	1685	4	Beav.	4-4½x6	G or K	3-4	Topp...B	30-45	3500	4	Wauk.	4-4½x6½	Gas.	3-4
Bates...	15-25	.....	4	Own	4-4½x6	Ker.	3	Lausen...21	15-30	1985	4	Beav.	4-4½x6	G or K	3-4	Toro Cultivator	6-10	.....	3	LeR.	4-3½x4½	Gas.	2
Bates Mule...H	15-25	.....	4	Midw.	4-4½x5½	Gas.	3	Lausen Road	15-30	2225	4	Beav.	4-4½x6	K	...	Townsend...	10-20	895	2	Wauk.	4-6½x7	Ker.	2-3
Bates Mule...F	18-25	.....	2	Midw.	4-4½x5½	Gas.	3	Leader...B	12-18	1095	4	Own	2-6 x6½	G,K,D	2-3	Townsend...	15-30	1485	2	Wauk.	4-7 x8	Ker.	3-4
Bates Mule...G	25-35	.....	2	Midw.	4-4½x6	Gas.	com.	Leader...N	16-32	1985	4	Clim.	4-5 x6½	G,K	3-4	Townsend...	25-50	2750	2	Wauk.	4-8½x10	Ker.	4-8
Beaman...G	2-4	315	4	Own	1-3½x4½	Gas.	...	Leader...GU	18-35	2775	2	Clim.	4-5 x6½	G,K	3-4	Tractor Motor	40-50	.....	4	LeR.	8-3½x5	Gas.	4-5
Best...	30	3100	2	Own	4-4½x6½	G,K,D	8-9	Leonard...E	20-30	2530	4	Buda	4-4½x6	G,K	3	Traylor...TB	6-12	715	4	LeR.	4-3½x4½	Gas.	1-2
Best...	60	5450	2	Own	4-6½x7	G,K,D	8-9	Liberty...A	18-32	2475	4	Clim.	4-5 x6½	G,K	4	Triumph...10	18-36	2450	2	Erd.	4-4½x6	Ker.	4
Boring...1921	1850	3	Wauk.	4-4½x5½	G or K	2	Linn...H4J	40	4500	3	Cont.	4-4½x6½	Gas	4	Trundar...1921	25-40	3750	2	Wauk.	4-5 x6½	G or K	4	
Burn-Oil, 1921	15-30	1650	4	Own	2-6½x7	Ker.	3-4	Linn...W	60	5100	3	Wauk.	4-5 x6½	Gas	6	Turner...1921	14-25	1295	4	Buda	4-4½x5½	G,K	3
Capital.....	15-30	1000	2	Own	4-4½x6	Gas.	3	Little Giant...B	16-22	2200	4	Own	4-4½x6	K	4	Twin City...	12-20	1580	4	Wauk.	4-4½x6	G,K	3
Case.....	10-18	800	4	Own	4-3½x5	G or K	2	Little Giant...A	26-35	3300	4	Own	4-5½x8	K	6	Twin City...	20-35	3175	4	Wauk.	4-5½x8	G,K	5
Case.....	15-27	1680	4	Own	4-4½x6	G or K	3	Lombard 1921	85-150	.....	2	...	6-5½x6½	Gas.	16	Twin City...	40-65	5250	4	Wauk.	4-7½x9	G,K	8
Case.....	22-40	3100	4	Own	4-5½x6½	G or K	4-5	Lombard 1921	50	.....	2	...	4-4½x6½	...	6-10	Uncle Sam C20	12-20	1385	4	Weid.	4-4½x6	G or K	2-3
Caterpillar T11	25	3975	2	Own	4-4½x6½	Gas.	4	Magnet...B	14-28	1875	4	Wauk.	4-4½x6½	K&G	3	Uncle Sam B19	20-30	2300	4	Beav.	4-4½x6	G or K	3-4
Caterpillar T16	40	6050	2	Own	4-6½x7	Gas.	6	Master Jr...	5-10	585	...	LeR.	4-3½x4½	Gas.	1	Uncle Sam D21	20-30	1985	4	Beav.	4-4½x6	G or K	3-4
Centaur.....	5-2½	355	2	N Way	2-4½x4½	G or K	1	Merry Gar1921	2	230	2	Evin	1-23x2½	Gas.	1	Universal...	1-4	475	2	Own	1-3½x5	G	1
Chase.....	12-25	1725	3	Buda	4-4½x5½	G or K	2-3	Minne...All-P	12-25	1200	4	Own	4-4½x7	G or K	3	Utiliter...501	2½x4	380	4	Wauk.	1-3½x4½	Gas.	2
Chicago...40	40	2500	4	Own	4-4½x6	G,K,D	2	Minne. Gen-P	12-30	1850	4	Own	4-4½x7	G or K	3-4	Victory...1921	9-18	1350	4	Gray	4-3½x5	Gas.	2
Cletrac...F	9-16	845	2	Own	4-3½x4½	G,K,D	2-3	Minne.	22-44	3300	4	Own	4-6 x7	G or K	5-6	Victory...1921	15-30	1750	4	Wauk.	4-4½x5½	G,K	3
Cletrac...W	12-20	1495	2	Own	4-4 x5½	G,K,D	2-3	Med.Duty Minne.	35-70	4600	4	Own	4-7½x9	G or K	8-9	Wallis...K	15-25	1600	4	Wauk.	4-4½x5½	G,K	3
Dakota.....	15-27	1500	3	Dom.	4-4½x6	Gas.	3	HeavyDuty Mohawk. 1921	8-16	785	2	Light	4-3½x4½	K or G	1-2	Waterloo...N	12-25	1450	4	Wauk.	2-6½x7	G,K	3
Dart...B.J.	15-30	1800	4	Buda	4-4½x6	Gas.	3-4	Moline Univ D	9-18	990	2	Own	4-3½x5	Gas.	2-3	Webfoot...53	28-53	5000	2	Wisc.	4-5½x7	G,D	6
Depue...A	20-30	2500	4	Buda	4-4½x6	Gas.	3	Moline Orch.	9-18	1075	2	Own	4-3½x5	Gas.	2-3	Wellington...B	12-22	.....	4	Erd.	1-4 x6	Ker.	2-3
Dill.....	20	2380	4	Cont.	4-4½x5½	Gas.	3	Motor Macult.	1¼	195	2	Own	1-23x3½	Gas.	3-4	Wellington...F	16-30	.....	4	Chief	4-4½x6	Ker.	3-4
Dill...R.W.	20	2980	4	Midw.	4-4½x6	Gas.	3	Motex.....	15-30	2250	4	Buda	4-4½x6	G,K,D	4	Western...1920	16-32	2100	4	Clim.	4-5 x6½	Gas.	4
Do-It-All...A	3-6	595	4	Own	1-4½x5	Gas.	1	NB.....1	3-6	425	4	Own	2-3½x4	Gas.	1	Wetmore21-22	12-25	1585	4	Wauk.	4-4 x5½	G,K	3
Eagle...F	12-22	.....	4	Own	2-7 x8	G or K	3-4	Nichols-Shep. 20-42	3100	4	Own	8 x10	G or K	3-6	Wharton...W-E	12-20	1800	3	Buda	4-4½x5½	Gas.	2	
Eagle...F	16-30	.....	4	Own	2-8 x8	G or K	4-5	Nichols Shep. 25-50	3460	4	Own	9 x12	G or K	4-7	Whitney...B	9-18	.....	4	Wauk.	2-5½x6½	Gas.	2	
E-B...AA	12-20	1445	4	Own	4-4½x5	G,K,D	3	Nilson Senior...	20-40	2475	5	Wauk.	4-5 x6½	G,K	4	Wichita...T	15-30	2000	4	Beav.	4-4½x6	G,K,D	3-4
E-B...Q	12-20	925	4	Own	4-4½x5	G,K,D	3	Oil Pull...K	12-20	1485	4	Own	2-6 x8	K,D	3	Wisconsin...E	16-30	2250	4	Clim.	4-5 x6½	G or K	3
E-B...	16-32	2080	4	Own	4-5½x7	G,K,D	4	Oil Pull...H	16-30	2285	4	Own	2-7 x8½	K,D	3	Wisconsin...H	22-40	3200	4	Wauk.	4-5½x7	G or K	4-6
Evans.....	18-30	2000	4	Buda	4-4½x6	G,K	3	Oil Pull...E	20-40	3175	4	Own	2-8 x10	K,D	5-6	Yuba...15-25	15-25	3100	2	Wisc.	4-4½x6	G,K,D	3
Fageol...D	9-12	1525	4	Lyc.	4-3½x5	Gas.	2	Oil Pull...G	30-60	4590	4	Own	2-10x12	K,D	8-10	Yuba...23-35	20-35	4185	2	Wisc.	4-5½x7	G,K,D	4
Farm Horse.B	18-30	1885	4	Clim.	4-5 x6½	G,K	3-4	Oldsmar GarK	2¼x5	395	4	Own	1-5½x5½	Gas.	1	Yuba...25-40	25-40	4650	2	Wisc.	4-5½x7	G,K,D	4
Farquhar...	15-25	.....	4	Buda	4-4½x6	G,K,D	3-4	Oliver...A	15-30	.....	2	Beav.	4-4½x6	G or K	3-4	Zelle.....	12-25	.....	4	Wisc.	4-4½x6	G or K	3
Farquhar...	18-35	.....	4	Own	4-6 x8	G,K,D	4-5	Once Over Tiler Mark...6	12-25	3000	4	Strns	4-4½x6	Gas.	2								
Farquhar...	25-50	.....	4	Own	4-7 x8	G,K,D	6-7	Parrett...K	15-30	1950	4	Pitt	4-4½x6	G,K	3	ABBREVIATIONS: G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make: Beav.—Beaver. Clim.—Climax. Cont.—Continental. Dom.—Domas. Evin.—Evinrude. Here.—Hercules. LeR.—LeRoy. Midw.—Midwest. Nway.—New Way. Nor.—Northway. Strns.—Stearns. T.C.—Twin City. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. *—Crawler type. All others are wheel type.							
Fitch.....	20-35	.....	4	Clim.	4-5 x																		



# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Cincinnati	Automotive Equipment Exposition	Nov. 26-Dec. 3
New York	Automobile Salon	Nov. 27-Dec. 3
London, Ontario	National Motor Show of Western Canada	January
New York	National Automobile Show	Jan. 7-13
Buffalo	Buffalo Automobile Dealers' Assn.	Jan. 14-21
Tulsa, Okla.	Automobile Show	Jan. 16-21
Oakland, Calif.	Automobile Show	Jan. 16-22
Milwaukee	Fourteenth Annual Automobile Show	Jan. 19-25
Cleveland	Cleveland Automobile Mfrs. and Dealers' Assn.	Jan. 21-28
Portland, Ore.	Annual Automobile Show	Jan. 23-29
Chicago	National Automobile Show	Jan. 28-Feb. 3
Chicago	Automobile Salon	Jan. 28-Feb. 3
Minneapolis	Tractor Show	Feb. 6-11
Minneapolis	Automobile Show	Feb. 6-11
Winnipeg, Canada	Canadian Automotive Equipment Assn. Show	Feb. 6-11
Kansas City	Kansas City Motor Dealers' Assn.	Feb. 9-16
Atlanta	Southern Automobile Show	Feb. 11-18
San Francisco	Sixth Annual Pacific Automobile Show	Feb. 11-18
Louisville, Ky.	Fourteenth Annual Automobile Show	Feb. 20-25
Syracuse	Fourteenth Annual Automobile Show	Feb. 20-25
Des Moines	Winter Automobile Show	Feb. 26-March 3
Springfield, Mass.	Seventh Annual Automobile Show	Feb. 27-March 4
Brooklyn	Eleventh Annual Show	March 4-11
Boston	Annual Automobile Show	March 11-18
Newark, N. J.	Newark Automobile Dealers' Assn.	March 11-18

## RACES

Los Angeles	Speedway Race	Nov. 24
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## FOREIGN SHOWS

Paris	Aviation Exhibition	Nov. 12-27
Shanghai, China	Automobile Show	Nov. 26-Dec. 3
Calcutta, India	Automobile Show	Dec. 19-24
Santiago, Cuba	Annual Automobile Show	March, 1922
Rio de Janeiro, Brazil	Automotive Exhibition	September, 1922

## CONVENTIONS

Columbus, O.	Ohio Automotive Trade Assn. Meeting	Dec. 12-14
Chicago	American Road Builders' Convention and Show	Jan. 17-20
Chicago	Fifth Annual N. A. D. A. Convention	Jan. 30-31

### HARTFORD SHOW SUCCESS

Hartford, Conn., Nov. 23—Hartford's first annual enclosed car show is regarded generally as having been a success, and among other things, sets aside the argument that an autumn exhibition will not draw the crowds.

The regular annual exhibition is to be held the latter part of February. That the dealers were able to have an enclosed car show at a trifling expense was due primarily to S. A. Miner, the Pierce-Arrow distributor, who gave the new building for the show free of charge, even before he had a chance to occupy it himself. This is indicative of the spirit that prevails among the dealers in Hartford.

David B. Roberts, proprietor of the Hartford Buick company, has a building next door to the show headquarters, and a very handsome salesroom. Mr. Roberts removed every car from his salesroom and left the place as bare as an empty church. He did this because he wanted to be on an equal footing with his fellow dealers, which act is another exemplification of the proper spirit.

### ONE BIG SHOW IN ATLANTA

Atlanta, Ga., Nov. 19—On account of the size of the Southern Automobile Show to be held here in February, 1922, and the fact that the Atlanta Automobile Assn. is laying its plans to make this the third largest show in the United States next year, the organization has canceled its plans for an enclosed car show that was previously announced to be held the latter part of this month. Virtually all of the available space for the 1922 show has already been disposed of, according to Virgil Sheppard, who is promoting the event for the Atlanta dealers.

### DEALERS HEAR KROH

Buffalo, Nov. 20—Two hundred automobile and allied dealers, at the first of a series of winter banquets of the Buffalo Automobile Dealers' Assn., in the Iroquois last evening, heard A. R. Kroh, of Akron, pronounce prospects for the automotive industry exceedingly good. His talk was interspersed with suggestions as to how dealers should cope with modern conditions of the trade. E. C. Bull, president of the association, presided.

## All States to Share in U. S. \$75,000,000 Road Fund

Money Will Be Administered Under  
Department of Agriculture;  
\$25,000,000 Available

WASHINGTON, D. C., Nov. 21—Seventy-five million dollars becomes available as federal aid for road construction in the various states, the money to be spent under the supervision of the Bureau of Public Roads, Department of Agriculture, under the Federal Highway Act. In addition, \$15,000,000 is appropriated for national forest roads. The \$75,000,000 represents the federal government's appropriation to the work of building highways in the various states, and must be matched, dollar for dollar, by funds from the state treasuries, except in states where more than five per cent of the area is unappropriated public land.

The \$75,000,000 appropriated is for the fiscal year ending June 30, 1922, and \$25,000,000 of the sum is available immediately, the balance becoming available on January 1, 1922. Here is the way the money will be apportioned among the 48 states:

State.	Allotment.
Alabama	\$1,553,420
Arizona	1,053,281
Arkansas	1,254,142
California	2,462,098
Colorado	1,341,175
Connecticut	480,897
Delaware	365,625
Florida	886,825
Georgia	1,997,957
Idaho	938,536
Illinois	3,246,281
Indiana	1,958,855
Iowa	2,102,872
Kansas	2,102,281
Kentucky	1,417,178
Louisiana	996,989
Maine	695,160
Maryland	640,629
Massachusetts	1,096,176
Michigan	2,249,532
Minnesota	2,123,597
Mississippi	1,294,906
Missouri	2,448,128
Montana	1,546,885
Nebraska	1,581,189
Nevada	953,436
New Hampshire	365,625
New Jersey	942,870
New Mexico	1,189,823
New York	3,696,447
North Carolina	1,709,333
North Dakota	1,164,714
Ohio	2,323,004
Oregon	1,752,339
Pennsylvania	3,398,953
Rhode Island	365,625
South Carolina	1,061,237
South Dakota	1,204,060
Tennessee	1,647,692
Texas	4,425,172
Utah	849,417
Vermont	365,625
Virginia	1,456,828
Washington	1,103,709
West Virginia	802,359
Wisconsin	1,894,815
Wyoming	934,617

Of the appropriation of \$15,000,000 for the improvement of national forest roads, \$5,000,000 is made available for the fiscal year ending June 30, 1922, and \$10,000,000 for the following fiscal year.